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JOHNSON (W. B.) & LLOYD (Llewellyn). **Report of the Tsetse Investigation, 1927.**—*Ann. Med. & San. Rep. Nigeria. 1927.* Appendix B. pp. 47–58. With 8 figs. (6 on 3 plates) & 1 chart. [2 refs.]

An account of field experiments in the control of *morsitans* and *tachinoides* was published during the year (and has been noticed in this *Bulletin*, Vol. 24, p. 891). In continuation of them the experiment of eradicating thickets of primary and secondary "foci" of the fly while leaving the forest in general untouched has been studied, and has been found successful with *tachinoides*, which is dependent on these foci throughout the year, though not so far with the freer ranging *morsitans*. The numbers of the latter species are reduced during the dry season when the species is dependent on the foci, but recover again during the wet season; but it yet remains to be seen whether a concentrated (and more costly) attack on the primary foci will foil the wet season spread and increase. Some clearing along streams for discomfiture of *palpalis* has also been done. The practice of late burning of jungle has not been successful since the cut stuff does not become dry enough for a thorough burn out before the onset of the rains. The matter requires further study, to decide between the comparative advantages of early clearing and burning or postponement of the late burning to the following dry season. In any case it will often be found necessary to go over ground again and repeat cutting and burning. An axe helved like a pick has been found far superior to the ordinary woodman's axe and machete, for clearing. The authors have confirmed for Glossina the discovery (made by CORNWALL and PATTON in working on certain Indian bloodsucking flies) of the presence of a coagulin in the salivary glands and an anticoagulin in the gut, and they devote a considerable part of their report to a technical account of these enzymes —and another considerable part to the use of the precipitin test for determining the source of the blood found in stomach of the fly.

The number of cases of sleeping sickness treated during the year is 364, with an undetermined mortality, since, although 6 fatal cases have been found out, only "a small proportion" of patients are heard of again. Cases in the later stages of the disease get a course of tryparsamide—1 gm. intravenâ on 1st day, 2 gm. on 4th day, followed by 2 gm. at weekly intervals, to a sum total of 13 gm. The results in general are good, with a very obvious improvement after the first dose. A few cases having a very short history, where trypanosomes could be demonstrated in the blood, were given a course of Bayer 205—

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a weekly injection of 1 gm. intravenâ for 5 weeks. A note is added of four natives on the staff who became infected some years ago and received the Bayer course soon after the onset of the disease, of whom one has remained perfectly well for nearly 5 years and the other three for 4 years.

A. A.

LAMBORN (W. A.). **Medical Entomologist's Report for 1927. Tsetse Control Scheme.**—*Nyasaland Protectorate Ann. Med. Rep. for Year ending* 31*st December*, 1927. Appendix III. p. 29.

This report tells a story of tsetse control near Fort Manning, which during the absence of the medical entomologist was in the hands of a small committee. Early in the year 1927, and as the rainy season advanced, fly broke southwards across the experimental belt of clearing in several places. The sub-committee thought that these invasions could be explained by the facts that the belt had hardly reached the maximum width fixed, and that only a small section of the proposed line of settlement had been completed. The sub-committee therefore recommended the continuation of the scheme in its original shape—the maintenance of the clearings, and the occupation of the villages on the line of settlement. At the end of the year an entire absence of fly south of the belt was reported.

Early in 1928 the medical entomologist returned and found only a few flies south of the line and observed also that the retreat of fly north of the line had been maintained, except in two places. He was satisfied with the result and wrote hopefully of proceeding with the scheme of clearing and settlement. The Director of Medical and Sanitary Services, however, adds the following postscript: " Since the completion of this report the fly has again crossed or come round the line, this time in such quantities that probably the scheme will have to be abandoned."

A. A.

JACK (R. W.). **Some Environmental Factors relating to the Distribution of** *Glossina morsitans* **Westw. in Southern Rhodesia.**—*South African Jl. of Sci.* 1927. Dec. Vol. 24. pp. 457–475. With 1 map in text.

This is an attempt to dissociate for practical recognition certain large obvious constituents of the natural environment of *Glossina morsitans* in Southern Rhodesia. The author's analysis includes merely configuration of the land, mean annual temperature and rainfall, geological formation, and general features of forest. His most general conclusion is that all areas in Southern Rhodesia that do not lie above 4,000 feet (or 5,000 feet in the lower latitudes), have an annual mean temperature not below 69° F. (or 70° F.), are forested (but not too densely), and are inhabited by game, are suitable for *Glossina morsitans*. He notices that Kalahari Sand (irrespective of its elevation) and Gusu forest (characteristic of the Kalahari formation) are generally shunned by the fly, but thinks that this avoidance may be due to deficiency of game rather than to any direct effect of soil or forest. His further observation that completely open country is not occupied by the fly unless it happens to be a haunt of game also illustrates the determinative influence of food supply.

A. A.

CURSON (H. H.). **The Probable Limits of *Glossina* Sp. in Zululand.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Nov. 25. Vol. 22. No. 3. pp. 281–284. With 3 figs. & 1 map on 2 plates. [6 refs.]
[Division of Vet. Services, Onderstepoort, Pretoria, S.A.]

Upon information recently collected by himself both personally and from other sources (official records, circulars, travellers, and traders)

[Reproduced from the *Transactions of the Royal Society of Tropical Medicine and Hygiene.*]

the author estimates the tsetse-fly infested area in Zululand to extend continuously through about one-third of the entire length of the country as represented in the map that accompanies his paper.*

A. A.

DUKE (H. Lyndhurst), HALL (G. Norman) & HADDON (E. C.). **An Examination of the Efficacy of Arsenical Solutions in the Reclamation of Tsetse Areas.**—*Bull. Entom. Res.* 1928. Aug. Vol. 19. Pt. 1. pp. 7–29. [11 refs.]

The work reported in this paper was suggested by a newspaper correspondence in South Africa advocating an intensified arsenical dipping of cattle as a means of ridding Glossina-infested tracts of fly. The idea seemed to have something in it; it appeared to explain, to popular satisfaction, the experience that fly had vanished from certain tracts subsequent to the importation of cattle that were regularly dipped; moreover HARRIS had shown that *Glossina pallidipes* settling on blotting-paper soaked in sodium arsenite absorbed the poison and quickly died. Thus there was a plausible case for the well-planned scientific investigation here fully recorded. The experiments show that a fly can take up poisonous doses of arsenic from either a wet or a dry *impermeable* surface which the insect has persistently to palpate and explore with its proboscis in vain attempts to effect penetration; but that when the vehicle for the poison is the inviting skin of a living animal, which can be penetrated quickly and without suspicious preliminary exploration, the risk of absorbing the poison is enormously reduced: this is the case even when the skin is actually wet with the arsenical solution, but when the fluid has dried on the skin the risk to the fly seems to be negligible.

Out of a full and varied tale of experiments the two following illustrate clearly enough the authors' line of argument:—

(1) Laboratory-bred flies were fed on alternate days for a term of 15 days on a bull that had been dipped regularly for many months; sixty-five per cent. of the flies were alive on the 15th day. As a control flies were fed on alternate days on a goat quite innocent of arsenic; forty-three per cent. of them were alive on the 15th day. (In considering the death-rate it is explained that during the first few days of their captivity in the experimental boxes almost always some flies die without having fed.) (2) A batch of 16 flies was set on a plot of skin of a live goat, the plot having just been well soused with a 5·5 per cent. solution of sodium arsenite; at the end of 24 hours 10 flies were dead and 6 were alive; but of the 10 dead the stomachs of six contained only a few blood cells of the goat (signifying difficulty in feeding), three were empty, and one contained human blood (indicating a feed prior to experiment); the 6 survivors of the experiment all had a stomach full of goat blood. A batch of 20 flies was set on a similarly-poisoned plot of the skin of a goat after it had dried; at the end of 24 hours 19 flies were alive and only 1 was dead.

There are, however, still two aspects of the question that might, perhaps, be further investigated. (1) HARRIS has demonstrated the attractiveness for tsetse-flies of conspicuous dummy animals. The surface of a dummy would be dry and impermeable and would, if impregnated with poison, be dangerous ground for inquisitive tsetse flies—should experimentation on this line be considered promising

* It was at Ubombo, Zululand, that BRUCE discovered the aetiology of nagana.

from the practical standpoint. (2) It appears to be established, both by experiment and by observation in the field—be the explanation what it may—that animals are fortified against the effects of trypanosome infection, or, at least, are much improved in health in a fly-infested territory, by arsenical dipping.

A. A.

LESTER (H. M. O.) & LLOYD (Ll.). **Notes on the Process of Digestion in Tsetse-Flies.**—*Bull. Entom. Res.* 1928. Aug. Vol. 19. Pt. 1. pp. 39–60. With 10 text figs. [7 refs.]

To begin with the authors draw attention to some interesting details of the alimentary tract of the tsetse fly, and in describing the method of feeding and the capacity of the crop and stomach they state that the weight of blood imbibed by the fly (average of five observations in each case) was for *Glossina tachinoides* male 220 per cent. and female 140 per cent. of the body-weight; and for *G. morsitans* male 140 per cent. and female 160 per cent. of the body-weight. Of their work on the enzymes and processes of digestion the following is the authors' own summary:—

"(1) The salivary glands of *Glossina* contain a powerful anticoagulin, which delays the clotting of blood of mammals, birds, reptiles and batrachians. It was found that when the salivary glands are removed from the living fly, it can still draw blood normally and may live long, but sooner or later large clots form in the narrow anterior portions of the alimentary tract, so that the fly can no longer feed and dies of starvation. The purpose of the anticoagulin is to prevent such clotting and blood coagulation in the crop.

"(2) The proventriculus and first third of the mesenteron are themselves inert in relation to coagulation of blood, but as removed from the normal fly they contain the anticoagulin which is derived from the salivary secretion.

"(3) The hinder part of the mesenteron contains a powerful coagulin, the purpose of which is to neutralise the anticoagulin and cause a rapid clotting, in order to retain the fluid meal in the proper region while draining and assimilation take place, probably also to save strain on the sphincter mesenteri and prevent the occasional loss of food through the anus.

"(4) Both enzymes have all the ordinary properties of ferments, the salivary enzyme being rather the more stable of the two. When mixed they probably unite by some weak chemical action and form an inactive compound. It also appears probable that the salivary enzyme combines loosely with some element in the blood in such a way that its neutralisation by the coagulant enzyme is delayed. The salivary enzyme is believed to intervene in what is considered to be the first phase of clotting, the formation of thrombin, and to be akin to antikinase. As the mesenteric enzyme has no effect on blood from which the calcium has been removed, it is not akin to thrombin and probably also influences the first phase of clotting, acting like the enzyme kinase.

"(5) Very rapid draining of the meal is necessary to lighten the fly and allow the blood to pass from the crop to the midgut while the salivary secretion still prevents its clotting. The mechanism of draining is described. The Malpighian tubes only function properly when the fluid of the meal has an osmotic pressure near that of blood. A large meal of water kills the fly, generally rapidly.

"(6) The names pro-, meso-, and meta-rectum are proposed for the regions of the hindgut."

A. A.

HICKS (E. P.). **The Relation of Rat-Fleas to Plague in Shanghai.**—*Jl. of Hyg.* 1927. July 15. Vol. 26. No. 2. pp. 163–169. With 1 chart in text. [11 refs.]

Though Shanghai is in close communication with ports where plague is endemic it has not suffered badly from plague; also the number of human cases is small in comparison with the number of infected rats found. Both *Xenopsylla cheopis* and *Ceratophyllus fasciatus* are present in considerable numbers, the former flourishing in summer and the latter in winter and spring. The author gives some reasons for concluding that *X. cheopis* is the chief local agent in spreading plague, and for thinking that plague is unlikely to reach Shanghai in the *cheopis* season. On the other hand he is inclined to regard *C. fasciatus*, the winter flea, as less likely to spread infection. The only other local rat-flea—and far the most abundant species of all—is *Ctenopsylla musculi*, which is said to be extremely reluctant to bite man. The author does not claim that these conclusions are much more than suggestions.

A. A.

CARRIÓN (Arturo L.). **Preliminary Report on a Rat-Flea Survey of the City of San Juan, Porto Rico. Second Paper.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. Aug. Vol. 4. No. 2. pp. 84–92. With 7 charts in text.

In a year up to June, 1928, the live rats captured at San Juan, Porto Rico, numbered 396, of which 74·49 per cent. were *Mus decumanus* and more than half the rest were the variety *alexandrinus*; fleas were found on a few more than half of them—2,600 fleas in all, of which 99·5 per cent. were *Xenopsylla cheopis*, all but 5 of the remaining fraction being Echidnophaga. The flea index as usual followed the humidity curve, being highest (11·8) in December, and lowest (2·6) in September. The record number of fleas on a single rat was 303, caught on an *alexandrinus*.

A. A.

PEARSE (A. S.). **Fleas found on Rodents and Insectivores in Nigeria.**—*Bull. Entom. Res.* 1928. Oct. Vol. 19. Part 2. pp. 167–169.

The rodents and insectivores from which the 8 species of fleas named in this list were collected are all residents of the jungle and desert. The list comprises 3 species of *Xenopsylla*, including *cheopis*; 2 species of Ctenocephalus, including *canis*; *Echidnophaga gallinacea*; a Ceratophyllus and a Synosternus.

A. A.

PAWLOWSKY (E. N.) & STEIN (A. K.). Ueber die giftigen Eigenschaften des Käfers *Paederus fuscipes* (Fam. Staphylinidae) auf die Menschenhaut. [**Toxic Properties of the Beetle, *P. fuscipes*, on the Human Skin.**]—*Ztschr. f. Parasitenkunde.* Berlin. 1928. Oct. 27. Vol. 1. No. 3. pp. 476–483. [4 refs.] [Zool. Inst., Milit. Med. Acad. & Skin Clinic, State Inst. for Med. Science, Leningrad.]

[The small Staphylinid beetles of the wide-ranging genus Paederus are notorious for their blistering property when handled.] The authors

find that this property is active equally in spring and autumn, so that the seasonal frequency of Paederus dermatitis in certain places is not to be explained by any periodic changes in the quality of the beetle. The vesicating element is not destroyed by heating to boiling point for half-an-hour, and it can be completely extracted by alcohol, chloroform, and ether.

A. A.

GLADIN (Sophie). Experimentelle Untersuchung ueber die Wirkung des Käfers *Paederus fuscipes* Curt. (Fam. Staphylinidae) auf das Kaninchenauge. [**Action of *P. fuscipes* on the Rabbit's Eye.**]—*Arch. f. Ophthalm.* 1928. Vol. 120. No. 1/2. pp. 229–234. With 1 coloured fig. [3 refs.] [Zool. Inst., Milit. Med. Acad., Leningrad.]

It has been supposed that the dermatitis caused by the urticating beetles of the Staphylinid genus *Paederus*—in this particular instance *P. fuscipes*—is due to the vesicant properties of the insect's blood and reproductive secretions, and that these come into play when the little insect is crushed on the skin and the sharp fragments of its hard and brittle cuticle scrape the epidermis. In a series of experiments on guineapigs the present author shows, among other things, that an extract of the beetle's cuticle, freed from any fragments of chitin, can set up, when introduced into the conjunctival sac, a conjunctivitis of some days' duration which also involves appreciably the cornea and the iris.

A. A.

IYENGAR (M. O. T.). **Infestation of the Human Intestine by Coprid Beetles in Bengal.**—*Indian Med. Gaz.* 1928. July. Vol. 63. No. 7. pp. 365–369. With 4 figs. on 1 plate. [11 refs.]

The author reports some more authentic instances of infestation of the bowel of children in Bengal by Scarabaeid dung-beetles of the genera *Onthophagus* and *Caccobius* He inclines to the opinion (see also this *Bulletin*, Vol. 21, p. 789) that the beetles enter per anum, since it is known that the closely related Australian beetle *Macropocopris* which normally infests the dung of the wallaby, has also been found in the cloaca and intestine of that animal.

A. A.

VENERONI (C.). Le paralisi da zecche in Somalia. [**Tick-Paralysis in Somalia.**]—*Arch. Ital. Sci. Med. Colon.* 1928. July. Vol. 9. No. 7. pp. 405–406. ["Principessa Maria" Colonial Hosp., Chisimaio, Italian Somaliland.]

Two cases are described. One, a child of 4 years with loss of voluntary movement of the legs and abolition of the reflexes; the second, a child of six years with a *Rhipicephalus simus* on its neck. This child presented tonic and clonic convulsions of the muscles of the neck and face, with rapid breathing and tachycardia, a condition which did not clear up for two weeks.

H. Harold Scott.

FRANCHINI (Giuseppe). Ixodidi delle colonie italiane dell'Africa del nord e dell' Africa orientale. [**Ixodidae of the Italian Colonies in Africa.**] —*Arch. Ital. Sci. Med. Colon.* 1927. Oct. Vol. 8. No. 10. pp. 555–558. [Inst. of Trop. Path., Univ., Bologna.]

This list of the ticks includes two new species, *Ixodes festai*, and *Rhipicephalus pulchellus humeralis*, which has been confused with *R. ecinctus* (Neum.).

H. Harold Scott.

PARROT (L.). Un ornithodore nouveau du Sahara Algérien *Ornithodoros foleyi* n. sp. [**A New Ornithodorus of the Algerian Sahara.**]—*Bull. Soc. Path. Exot.* 1928. July 11. Vol. 21. No. 7. pp. 520–524. With 5 text figs. [Pasteur Inst., Algiers.]

The species here described and figured in minute detail was found in the sand in the Algerian Sahara. It is said to attack man and the dromedary, and to cause in man a lesion resembling a boil or a chancre. It is described as having a general resemblance to *O. tholozani* and *O. canestrinii*—differing in the surface sculpture of the body, in the form of the tarsi and of the first pair of coxae, and in the form and dentition of the hypostome.

A. A.

RUGE (Heinrich). Kurze Beschreibung des *Ornithodorus venezuelensis* (Brumpt 1921). [**Short Description of** *Ornithodorus venezuelensis*.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Aug. Vol. 32. No. 8. pp. 406–409. With 8 text figs. [1 ref.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The description is as follows :—

Colour sandy yellowish-brown. Eyes not visible. Body with sides parallel, anteriorly pointed, posterior border semicircular ; [i.e., pentagonal with hind border convex]. Back thickly beset with small polygonal granules, and with numerous short hairs. Capitulum sunk in a camerostome having tumid edges and movable side-flaps reaching—as also do the chelicerae—to the end of the third segment of the stoutish pedipalp. Hypostome shorter than the chelicerae, longitudinally grooved and having only a single row of teeth [on each side]. Coxae of one size and in contact. Only the tarsus of the 1st pair of legs has a *prominent* tubercle on the anterior border.

A. A.

PAWLOWSKI (E. N.). L'étude des tiques Ornithodorus, comme le problème de tour des études regionalez dans la moyenne Azie. [**Ornithodorus Studies in Central Asia.**]—*Pensée Méd. d' Usbékistane*. Tashkent. 1928. June–July. No. 9–10. French summary p. 96. [In Russian pp. 5–11. With 3 figs. 11 refs.]

Ticks of the genus *Ornithodorus* now being known to transmit typhus fever in Central Asia, the author appeals for collections of ticks from that region to be sent to him for study at the Zoological Museum of the Academy of Sciences at Leningrad.

A. A.

WARBURTON (Cecil). **The Harvest Bug. An Account of the Present State of our Knowledge of the Larval Trombidiid Mites attacking Man.**—*Parasitology.* 1928. July. Vol. 20. No. 2. pp. 228–236. With 2 text figs. [20 refs.] [Molteno Inst. for Research in Parasit., Cambridge.]

This useful paper clarifies our knowledge of the minute hexapod mites, known " popularly " (save the mark) as harvest-bugs, harvest-mites, bête rouge, rouget, chigger-mites, and scientifically as Trombidiid larvae, which in many parts of the world are a torture to mankind at certain seasons. The author gives the following list of the species known to attack man; individually they have been described under many different names but the generic name " Trombicula alone possesses any validity ": *Acarus batatus*, L., the " batatas " of Surinam; *Leptus autumnalis*, Shaw, the European harvest-mite; *Trombidium americanum*, Riley, and *T. irritans* Riley, North American harvest-mites; *Trombidium tlasahuate* Brumpt, the " tlasahuate " or " tlazahuate " of Mexico; *Trombicula akamushi*, Brumpt, the " Kedani " or river-fever-mite of Japan; *Microtrombidium wichmanni* Oudemans, *M. vandersandei* Oudemans, *Trombicula deliensis*, Walch, and *T. shueffneri*, Walch, all from the Dutch East Indies; and *Leeuwenhoekia australiensis*, Hirst, the Australian harvest-mite. Besides these there are two other European species the exact designations of which still seem to be uncertain.

Acarus batatus was named by LINNAEUS in 1758, and *Leptus autumnalis* was recognized as being merely a larva (and not, as previously supposed, adult) in 1834, but it was not until 1916, when MIYAJIMA and OKUMARA followed the development of the " kedani " or Japanese river-fever-mite, that the main facts in the life-history of a Trombidiid larva became coherent knowledge. The larva in question attacks several small mammals and particularly fieldmice, adhering to the ears. It remains on its host 3 or 4 days, and then drops to earth. In a week, or rather more, nymphs emerge, which are not predaceous and can be reared (in a moist atmosphere) on mild (not acid) juicy vegetables. " After growing somewhat " the nymphs take to earth, and " a few days later " assume a form almost like the adult, " but probably requiring another moult." When the adult form had thus become recognizable, the adults were discovered in nature among decaying leaves, and in grass, and in the silt left by floods, feeding—as did the nymphs—on a kind of reed and on a species of Artemisia. Subsequent to the Japanese determination of the genetic status of the " kedani " mite, one of the North American harvest-mites, " *Leptus* " *irritans*, was reared and also proved to be the larva of a Trombicula.

Regarding the European harvest-mite, " *Leptus* " *autumnalis*, BRANDIS in 1897 observed that it took to earth and that about a month or 6 weeks afterwards a nymph emerged, and BRYANT in 1910 also obtained from a large number of larvae a single nymph which was with some hesitation attributed to the genus Microtrombidium; but the adult form has not yet been certainly identified, although HIRST in 1925 reared a single " nymphal female " which is only one moult short of the adult phase.

All the harvest-mites whose development has been followed hitherto have thus been proved to be of the Trombicula type. The life-history of the " batatas " of Surinam and of the " tlazahuate " of Mexico appear to be still unknown, but all the harvest-mites from the Dutch East Indies are considered to belong to the genus Trombicula. A. A.

GROMASCHEWSKIJ (L. W.) & SCHUCHAT (J. A.). Milben in den Faeces des Menschen. [**Mites in Human Faeces.**]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 4. German summary pp. 278–279. [In Russian pp. 209–216. With 4 figs. 14 refs.]

The authors, in Odessa, examining the stools of a lot of 46 school children for evidence of worms, found mites and mite-eggs in 50 per cent. of them (44 per cent. boys and 57 per cent. girls). The mites were chiefly food-mites of the species *Tyroglyphus farinae*. [It is not made clear in the translation that the mites were alive.]

A. A.

VITZTHUM (H. Graf). Zoologische Acarusstudien. [**Zoological Studies on Acari.**]—*Ztschr. f. Parasitenkunde.* Berlin. 1928. Apr. 17. Vol. 1. No. 1. pp. 1–23. [18 refs.]

This is an academic dissertation on the species, or varieties, of itch-mites, based on a zoological transmutation of a botanical text that " a fundamental obstacle to finality in the taxonomy of the Schizomycetes [*lege* itchmites] is the fact that the study of them has been so multifariously prosecuted by ' non-botanists ' [*lege* non-zoologists]."

A. A.

STEPHENS (J. R. C.) ; GLOVER (William E.). **Porocephalus Armillatus.** [Correspondence.]—*West African Med. Jl.* Lagos. 1928. July. Vol. 2. No. 1. p. 107.

Stephens, from Ilorin (Nigeria), refers to a case reported by him where *Porocephalus armillatus* [presumably encysted, since the specimens were numerous] was found during an operation upon a healthy African for hernia. He elicited the fact that the man was accustomed to eat snake-flesh smoked but not properly cooked.

Glover mentions his finding at an autopsy on an African at Enugu, of 30 or 40 encysted specimens of *P. armatus* embedded in the liver and intestines.

A. A.

MANUWA (S. L. A.). **Notes on a Case of Porocephalosis.**—*West African Med. Jl.* Lagos. 1928. July. Vol. 2. No. 1. pp. 109–110.

Manuwa describes at some length the discovery, post mortem, of numerous larvae of *Porocephalus armillatus* in the liver and the spleen of a male Ibo of 28 years who died in the Calabar hospital, two hours after admission in a state of wild delirium. The condition of the lungs, post mortem, indicated tuberculous broncho-pneumonia as the cause of death. " Porocephalosis cannot with certainty be said to [have been] a contributory cause."

A. A.

BULLETIN OF THE ANTIVENIN INSTITUTE OF AMERICA. Philadelphia, Pa. 1928. June. Vol. 2. No. 2. pp. 25–53. With 6 text figs.

Besides some short notes there are 11 articles in this number. Three of them, on snakes of Central America, cover the same ground as the

papers from the United Fruit Company's 1927 Report, already noticed. Three others are interesting and amusing, but hardly come within the scope of the *Tropical Diseases Bulletin.* From what remains the following items are abstracted.

In "New Facts about Snakes" F. W. FITZSIMONS states that he has frequently observed persons to suffer from a sort of chronic poisoning after receiving a sub-lethal dose of venom in a bite from cobra and (more often) from puff-adder. The symptoms are those of partial paralysis of the bitten limb and periodic sloughing near the site of the bite. "An Unusual Snake-bite Accident," by S. W. CARTWRIGHT, tells of an attendant who in the process of administering first aid in a case of snake-bite got some of the blood that exuded from the bite into an abrasion of his own finger: about 2 hours afterwards nausea and vomiting occurred and persisted, and the finger swelled considerably. The patient himself (who in due course was treated with antivenin) had no symptoms.

F. EIGENBERGER describes in detail the effects upon himself of intradermal injection of a moderate dose (0·2 cc. of a dilution of one drop of venom in 10 drops of normal saline) of the venom of *Dendraspis viridis* [an African Elapine snake]. An immediate burning sensation was followed in 5 to 10 minutes by localized itching and swelling; then by distressing excitability of all cranial nerves, and such misery as drove him to excise the swelling, apply a tourniquet, and use $KMnO_4$; then by numbness, beginning in face and throat and extending to fingers and toes, with motor paresis, dysphrasis, dysphagia, and dyspnoea. The culmination of all these symptoms occurred at about 1½ hours after the injection. At about 2 hours all the numb regions became painful, till at 5 or 6 hours the whole body—but particularly in the distribution of the cranial nerves—was painful wherever touched. The sensorium was not affected. The author was well enough to do his work next day. He thinks Dendraspis venom is not essentially different from cobra venom—perhaps more neurotoxic and more pronounced in its effect upon the cranial nerve-centres. D. D. H. MARCH reports an interesting medico-legal case from Quirigua hospital. Two men had quarrelled, and one had threatened to take the other's life. Subsequently both men had started for home by the same road, the more vindictive man some time after the other. The threatened man, however, never got home, and a search-party found his dead body a few feet off the road, with blood on the lips. Fortunately the post-mortem examination was in competent hands; no signs of violence were found on the body, but on one leg, which was oedematous, two close-set punctures were discovered; furthermore, there was abundant evidence of general haemolysis. It was evident that the man had been bitten by a snake, and probably by a fer-de-lance.

We may refer, finally, to the Costa Rican law for protection of the people against snake-bite, a translation of which is here published; its provisions prohibit the sale of quack remedies, ordain the machinery both for the education and for the treatment of the public against snakes and snake-bite, and impose upon employers of labour the obligation of keeping all the material necessary for serum treatment, in places where it is likely to be required. If a labourer die from snake-bite in any industry where the local supply of such material is not maintained the responsible employer shall pay to the victim's relatives a sum equal to the victim's last year's salary.

A. A.

Bulletin of the Antivenin Institute of America. Philadelphia, Pa. 1928. Oct. Vol. 2, No. 3. pp. 55–79. With 8 text figs.

This number contains four papers that come within our purview.

1. A concise report of four cases of rattlesnake-bite among the Navajo Indians, by Dr. R. H. Pousma. (*a*) A girl of 7 years bitten on the foot and seen 7 hours afterwards, when she was in great pain and had a leg greatly swollen and discoloured to the thigh. The wound was incised and the leg was kept in warm solution of $KMnO_4$ for 24 hours; this abated the pain but the swelling spread upwards to the sternum and did not entirely disappear, still leaving some discolouration, until 21 days afterwards. (*b*) A man of 27 years bitten on the index finger and treated to a tourniquet, but not seen for 10 hours, when he was dizzy and in great pain, and had a forearm swollen and discoloured. Antivenene was available and he received 10 cc. into the muscles. The following morning all pain was gone and the swelling had almost vanished. (*c*) A boy of 9 years bitten in the calf and ligatured *below* the knee, but not seen for 18 hours, when he was suffering from pain and a swollen and discoloured leg; 10 cc. of antivenene were given into the muscles. The swelling spread up the thigh, but gradually disappeared in the course of 6 days. (*d*) A girl of 14 years bitten on the outside of the forearm and not seen until 26 hours afterwards when she was in great agony and moribund, the whole arm and corresponding side of the chest being greatly swollen and discoloured. No antivenene was at hand, and she died 4 hours afterwards.

2. A report of a grave case of rattlesnake-bite (*Crotalus atrox*), by Dr. S. P. Ehrlich. The patient, a lady of 30 years, and a past-mistress in the art of handling snakes, was badly bitten, four times, in the web of the thumb. The effects were as follows: immediate paralysing pain and discoloured swelling; in 5 minutes, nausea and "weakness"; at 20 minutes, great thirst, and tingling and numbness in *the other* hand; at 30 minutes, vomiting, cold sweat, impression of impending suffocation, and increased pain and swelling of the wounded hand; at 35 minutes, intense general and distracting urticaria, repeated vomiting; at 45 minutes, spasmodic breathing and sensation of impending death. Vomiting and great thirst continued at intervals for some hours, and the swelling at last involved the whole arm. Under appropriate treatment the patient began to improve at the end of 24 hours; the swelling went down on the 5th day, and on the 12th day she was recovered except for some superficial sloughing at the site of the bite. The treatment was as follows: at once a tourniquet and free irrigation followed by iodine; then incisions, and cupping continued for 3 hours, and followed by continuous bathing with hot magnesium sulphate for several hours; at 48 minutes after the accident 10 cc. of antivenene, followed in 15 minutes by another 20 cc., and a good many hours afterwards by another 10 cc. Novocaine and adrenalin were also given.

3. Mr. R. E. Stadelman gives a very careful time-record of the effects as impressed upon his own flesh and intelligence of the bite of a young copper-head viper (*Ancistrodon contortrix*) not quite $5\frac{1}{2}$ hours old and weighing about 6 grammes. The bite was not treated, and the observations prove that a new-born copper-head's venom is sufficient in quantity and quality to cause very unpleasant results. Eighteen days after the bite the subcutaneous tissues at the site were still somewhat indurated.

The fourth paper for our notice is a brief sketch of the subject of antivenoms against the poisons of scorpions and spiders. A. A.

i. Clark (H. C.). **Snakes from the Santa Marta Region, Colombia.**—*Sixteenth Ann. Rep. Med. Dept., United Fruit Company, Boston, Mass.* 1927. pp. 273–274. [Med. Dept., United Fruit Co.]

ii. Phelps (B. M.). **A Snake-Bite Case. Special Report from Puerto Castilla, Honduras.**—*Ibid.* pp. 274–275.

iii. Macphail (N. P.). **Report of Snake-Bite Cases.**—*Ibid.* pp. 275–276. [Quirigua Hosp., Guatemala.]

iv. Carroll (R. L.). **Cases of Snake-Bite treated in Almirante Hospital, Panama, during the Year 1927.**—*Ibid.* pp. 276–279.

v. Clark (H. C.). **The United Fruit Company's Cooperative Action in the Development of Antivenins.**—*Ibid.* pp. 279–291. With 6 figs. [13 refs.] [Med. Dept., United Fruit Co.]

i. The venomous snakes identified in the paper by Clark are 2 species of Elaps, which are said to be not at all aggressive; a rattlesnake, *Crotalus terrificus*, known in the vernacular as *cascabela*; and 2 species of Lachesis, namely *L. atrox* (*fer de lance, barba amarilla, terciopelo*) and *L. lansbergii*.

ii. In the case of snakebite from Honduras the offending snake is believed to have been the fer-de-lance (*L. atrox*). The bite was on the foot. The symptoms recorded are local pain and swelling, vomiting, and expectoration of bloody stuff. The treatment was by suction and $KMnO_4$ locally, and antibothrops serum. The patient was discharged, entirely well, in a week.

iii. Of Macphail's 8 cases, 3 seem to have been bites by harmless snakes. In the other 5, the offender was recognized as *L. atrox* in 2, and probably was that species in the rest. Of the envenomed bites 3 were on the leg and 2 on the hand. All were admitted many hours (5 to 24) after infliction of the bite. Bleeding from mucous surfaces is recorded in all 5, collapse in 3, gangrene and sloughing in 2. One case, admitted in an unconscious condition, was fatal. Antiophidic serum was used in the treatment.

iv. Of the 10 cases reported by Carroll, 8 were bites by venomous snakes, the bite being on the foot in 3, on some part of the leg in 2, on the finger in 2, and on the arm in 1. In one instance the offending species was *L. atrox*, in another *L. schlegelii*; in the other 6 [all undoubtedly Viperids] the species was not recognized. All the cases were admitted long (4 hours to 3 days) after the accident. Antiophidic serum was used in treatment. The symptoms following bite (on finger) by *L. schlegelii* were merely "slight swelling." The symptoms recorded in the other 7 cases were local pain in 2, numbness in 1, swelling in 3, dizziness in 2, vomiting in 2, bleeding from wound or mucous surfaces, or both, in 6, sloughing in 1.

v. Clark tells how the United Fruit Company, realizing the danger, but ignorant of the specific powers of the local venomous snakes, began their precautionary operations with a survey of the snakes of their territories in the northern plains of Honduras. The survey was continued for about 16 months, and 3,349 snakes were collected. By treaty with Dr. Thomas Barbour the collection was sent for specific determination to the Museum of Comparative Zoology at Cambridge in Massachusetts, where 603 specimens representing 4 species were found to be venomous, more than half of these being *L. atrox*, the dreaded *fer-de-lance*. Subsequently, a survey of snakes was made in Colombia,

and further information was acquired in neighbouring countries where the United Fruit Company has plantations, and now the venomous snakes with which the Company has to deal are known to be of 6 species, namely: *Lachesis atrox*; *L. schlegelii* (the "horned palm viper," *bocaracá, toboba-de-pestanas, oropel*), which is not very dangerous; *L. brachystoma* (the "hog-nosed viper," *tamaga*), probably dangerous; *L. mutus* (the "bushmaster"), notoriously dangerous; *Crotalus terrificus* (*cascabela*), also very dangerous; and *Elaps nigrocinctus* (a coral snake, *gargantilla*) of burrowing habit, very venomous, but not given to biting. The extent and the specific characters of the danger having been defined, the Company has started a laboratory and snakery at Tela in Honduras, where live snakes are kept and studied and milked of their venom, which is collected, dried, and despatched to the Antivenom Institute of America, for employment in the making of antisera. A similar establishment at Santa Marta in Colombia is in prospect.

A. A.

PAMPANA (Emilio J.). I serpenti velenosi della Colombia. [**Venomous Snakes of Colombia.**]—*Arch. Ital. Sci. Med. Colon.* 1928. Vol. 9. No. 4. pp. 3–13. [7 refs.]

The author gives an interesting sketch of the poisonous snakes which he has met with during six years of practice in Colombia. The commonest is *Lachesis leptura*, which lives mainly in the forest, so that cases of human victims are rare. Death in one instance occurred in 30 hours. *L. brachystoma*—the hog-nosed viper—is next; if not fatal its bite is followed by extreme necrosis. Third in frequency is *L. mutus*, the "bushmaster," which lives chiefly on rats and consequently is found in or near houses, as in the wood-pile. One case is recorded of death in 10 minutes, but it is probable that the poison was injected directly into a blood-vessel. Next come *L. atrox* and *L. lanceolatus*, which some regard as synonymous. These are most dreaded and are responsible for the majority of human cases of snake-bite. *L. schlegelii* is a small snake of some 50 cm. in length, often conveyed with fruit, but found also in houses. The author's specimen was given him by a lady who found it in her slipper when she got out of bed one morning. It is apparently not very aggressive; this one did not attack and an instance is mentioned where a child amused itself with one for several mornings before the parents discovered what was going on. This had been brought in with some bananas. Lastly, *L. jararacuça*, which BOULENGER regards as a variety of *L. lanceolatus*.

The species of Elaps mentioned are *E. margravii*, *E. fraseri*, *E. corallinus*, *E. lemniscatus* and *E. spurrelii*.

These poisonous snakes have as notorious natural enemies *Oxyrhopus cloelia* and *Erythrolampus aesculapii*, which, it is stated, live solely on snakes.

Specific treatment is applied when possible with sera from the Institute at Butantán, the recognized procedure being to bring the patient and the snake up together so that there may be no doubt as to the antivenin to be employed.

The paper is full of interest.

H. Harold Scott.

Finney (W. P.). **Rattlesnake Bite. Report of a Case.**—*Proc. Staff Meetings of Mayo Clinic.* Rochester. 1928. Sept. 12. Vol. 3. No. 36. pp. 272–273.

In this case the patient, an expert snake-catcher, had the inevitable hair's-breadth escape, fortunately little more than a scratch—not a fair bite—on the forefinger, from a big rattlesnake. The arm swelled, and, since he sucked the wound, the lips and tongue also became swollen and numb. He scarified and iodined the wound and 5½ hours later had professional treatment, including antivenin. Subsequently, the swelling and extravasation spread to the shoulder, and there was slight haematuria and epistaxis, but the patient did not complain much of pain. It was noticed that at one time the red cells dropped to 2,720,000, and the leucocytes rose to 17,900 and the platelets to 70,000. Patient said he felt quite well after 5 or 6 days.

A. A.

Doughty (J. Frank). **Rattlesnake Bite.**—*California & Western Med.* 1928. Oct. Vol. 29. No. 4. pp. 237–240. With 2 text figs. [13 refs.]

Two fatal cases of bite by rattlesnake, occurring at end of February and middle of March [when, after hibernation, the venom would probably be very active].

In the first, a 3-year-old boy was bitten three times on the left leg. The limb was ligated, and the wounds were frequently sucked. At about half-an-hour the whole leg was swollen and ecchymosed (the swelling subsequently spreading to the hip), the patient being conscious, now lethargic and now excited; the wounds were then incised and treated with solid $KMnO_4$. At 6 hours 10 cc. of the viperine antivenom issued by the Paris Pasteur Institute was "administered"; and subsequently caffein was given hypodermically every half-hour. But the little patient became weak and died comatose [interval not stated]. In the other case a girl of 20 years was bitten on the dorsum of the right foot. A ligature was improvised at once. At 1½ hour the foot and leg were swollen and discoloured, but the heart beat was good; the wounds were then incised. At 2½ hours 10 cc. of a specific antivenom were injected under the skin, and subsequently the ligature was intermittently relaxed. At 5 hours abdominal cramp occurred, and the swelling leg, now hyperaesthetic, was again incised. At 8 hours the cramp was very severe and vomiting occurred, the patient being pale and cyanotic, the pulse and breathing quickened, and numbness spreading up the leg. Stimulants—adrenalin, camphor, and caffein were given. At 17 hours death came, the mind being clear to within five minutes.

The author has analysed and tabulated the significant facts relating to nineteen recorded fatal cases of bite by rattlesnake.

A. A.

Jackson (Dudley) & Harrison (W. T.). **Mechanical Treatment of Experimental Rattlesnake Venom Poisoning.**—*Jl. Amer. Med. Assoc.* 1928. June 16. Vol. 90. No. 24. pp. 1928–1929. [1 ref.] [Hygienic Lab., U.S. Public Health Service, Washington, D.C.]

The mechanical treatment here tested was after applying a ligature, to make numerous small incisions into the subcutaneous tissue of the area into which the venom had been injected and then to apply suction by the usual means of inverting a funnel connected with a rubber bulb

over the scarified area, the suction being repeated at intervals during 20 to 30 hours. A dog that had received 4 minimum lethal doses of rattlesnake venom was recovered by this treatment begun an hour after the dose had been injected, and the life of two other dogs was much prolonged by similar treatment.

A. A.

Nicholls (Lucius). **"Massage in the Treatment of Venomous Snake-Bites."**—*Indian Med. Gaz.* 1928. Oct. Vol. 63. No. 10. pp. 574–575.

The author has seen general massage practised by "bush doctors" in the West Indies as good medicine for snake-bite, and he seems to think rather nobly of it, as tending to divert the venom away from the "vital" viscera to the muscles.

A. A.

Moritsch (Paul) & Pirker (Herbert). Zur Serumtherapie bei Bissen durch ostindische Vipern. [**Serum Therapy in Bites by Javan Vipers.**]—*Wien. Klin. Woch.* 1928. Aug. 30. Vol. 41. No. 35. p. 1255. [6 refs.] [State Serotherap. Inst., Vienna.]

Krauss, corroborated by Moritsch, has shown (see this *Bulletin*, Vol. 24, p. 404) that South American anti-viperine (Lachesis and Bothrops) serums can neutralize the venom of the European viper, and Otto (Vol. 25, p. 292) that East Indian (Java) polyvalent antivenom, although it can neutralize European viper-venom to some extent *in vitro*, cannot do so *in vivo*. The present author's experiments show that South American anti-Bothrops serum neutralizes East Indian viperine (Ancistrodon) venom *in vitro* when the two are left in contact for some time at 37° [C.], but not *in vivo*.

A. A.

Phisalix (M.) & Pasteur (F.). Action des rayons ultraviolets sur le sérum de la Vipère aspic. [**Action of Ultra-Violet Rays on the Serum of the Viper.**]—*C.R. Acad. Sci.* 1928. June 18. Vol. 186. No. 25. pp. 1756–1758. [2 refs.]

The authors have shown recently that the ultra-violet rays destroy the venomous and rabic antigens of viper venom without modifying its toxicity, and they now show that the ultra-violet rays have exactly the same effect upon the serum of the viper.

A. A.

Renaud (Maurice). Pouvoir neutralisant des savons sur le venin de cobra (cryptotoxine venimeuse). [**Neutralizing Power of Soaps on Cobra Venom.**]—*C.R. Soc. Biol.* 1928. July 13. Vol. 99. No. 24. pp. 496–498. [3 refs.] [Collège de France, Paris.]

Vincent in 1907 discovered that oleate and palmitate and margarate of soda—in fact, soaps in general—can under given conditions neutralize microbe-toxins, rendering them harmless though still capable of imparting immunity in repeated doses; toxins thus disarmed yet still "immunogenous" he called cryptotoxins.

The present author experimenting with accurate doses of cobra-venom and solutions of palmitate of soda (or of the medicinal soap of the French pharmacopoeia) finds that cobra-venom also is detoxified by these solutions, although the detoxification developes slowly. The mixture of venom and soap solution (maintained at a temperature of 38° C.) continues toxic for the first 4 to 6 days, but after that time it becomes so innocuous that guineapigs can tolerate an injection corresponding to 40 lethal doses of pure venom. The neutralization of the venom occurs only in soap solutions of a certain concentration. Whether the detoxified venom is cryptotoxic and capable of imparting immunity is a question still to be determined by experiment.

A. A.

Morrison (N.). **The Immunity to Adder Venom of Slow-worms, Frogs, and Toads.** [Correspondence.]—*Nature.* 1928. Nov. 17. Vol. 122. No. 3081. pp. 769–770. With 2 text figs.

The correspondent, who seems to be not aware that resistance to snake-venom is a well-known phenomenon, imparts the information that he has repeatedly made healthy adders plunge their fangs into frogs and toads and slow-worm lizards without serious damage to any of those animals.

A. A.

Kangragsat (Sanit). Recherches expérimentales sur les variations des venins des serpents venimeux et sur l'immunisation contre les venins des divers serpents venimeux au Siam. [**Experiments on Snake Venom and Immunization in Siam.**]—*Rev. Path. Comp. et Hyg. Gén.* 1928. Nov. 5–20. Vol. 28. No. 360–361. pp. 1082–1087. [10 refs.]

There is nothing new or suggestive in this paper, which merely contains diagnoses of 4 of the commonest and most notoriously deadly Oriental snakes—here said to be the dangerous snakes in Siam, and summarizes some experiments illustrating the ultimate effects of their venom and the corresponding antivenom.

A. A.

Boquet (A.). Sur l'adsorption du venin de cobra et de la toxine diphtérique par le charbon. [**Adsorption of Cobra Venom by Charcoal.**]—*C.R. Acad. Sci.* 1928. Nov. 19. Vol. 187. No. 21. pp. 959–961. [2 refs.]

In the author's experiments 1 gm. of sterilized charcoal is suspended in 50 cmm. of a saline solution of 50 mgm. of dry cobra venom, and the mixture is left for two hours either at room temperature or otherwise, and then is filtered. The filtrate is perfectly harmless, even in subcutaneous injections corresponding to 125 lethal doses of venom, when injected into guineapigs and mice. The adsorptive property of the charcoal is also efficacious *in vivo*, upon as much as 2 lethal doses of venom, if the charcoal (in suspension) be injected either simultaneously with the venom under the skin of the animal, or up to six minutes after the venom if by intraperitoneal route. Venom inactivated by charcoal imparts little or no immunity against pure venom, however—even after two successive injections have been received.

A. A.

DE MAGALHÃES (Octavio). Contribuição para o conhecimento da intoxicação pelo veneno dos "escorpiões." [**Poisoning by Scorpion Venom.**]—*Mem. Inst. Oswaldo Cruz.* 1928. Vol. 21. No. 1. pp. 5–153. With 25 figs. & 4 graphs on 12 plates. [108 refs.] French summary pp. 155–159.

The author has studied the venom of *Tityus bahiensis*, *T. serrulatus*, *T. dorsimaculatus*, and *Bothriurus* sp. incert. The venom of 13,640 individuals has been tested on 97 species of animals, from protozoa to man. The adult, but not the new-born, Armadillo (*Tatua novemcincta*) is entirely immune; and the domestic fowl, the guineafowl, the turkey, the vulture, and the *saracura* and *jacu* possess a certain amount of immunity; but the scorpions themselves do not seem to be immune to their own specific venom. In all four species the venom is characteristically neurotoxic for both the cerebrospinal and the sympathetic systems. Its effects upon the former are seen in various forms of locomotor paralysis, and in nystagmus, blindness, and sensory disturbances; its effects upon the sympathetic system are manifested in diarrhoea, polyuria, abortion, and affections of the lacrymal glands and milk-glands. The venom of *Tityus bahiensis* and *T. serrulatus* also contains haemolysin, haemorrhagin and lipolysin, and that of *T. serrulatus* is also proteolytic. Effective specific antivenoms have been prepared by the author. Tyrosin has a decided, and dahlia-juice a slight neutralizing action on the venom.

A. A.

INNISS (K. U. A.). **Some Observations on Scorpion Poisoning.**—*Jl. Port-of-Spain Med. Soc.* 1927. pp. 176–184.

Scorpion-sting is not uncommon in the Manzanilla District of Trinidad. The annual average number of deaths for the last five years was 4·8. During the last three years the author has treated 71 cases, and deaths among them include two adults. The burning pain of the sting soon passes off, leaving no local effects; but, usually within half an hour, a general intoxication is made manifest in nausea, intractable vomiting, difficulties of respiration, and cardiac and epigastric distress. There is always great restlessness, and in cases of one class this may pass into convulsions and unconsciousness, or even into maniacal disorder. Frequently there is a considerable, but transient, rise of temperature, and it is not uncommon to find sugar in the urine. For local treatment the author prefers injections of colloidal manganese, as being painless; for stimulants, aromatic spirit of ammonia, and if necessary adrenalin; for convulsions, morphine or hyoscine; and for general comfort, chlorodyne.

A. A.

SACÓN (Jorge J.). Sobre un caso mortal y otro grave de picadura de escorpión. [**Two Cases of Scorpion-Sting, One Ending Fatally.**]—*Prensa Méd. Argentina.* 1928. Aug. 10. Vol. 15. No. 7. pp. 302–309. [16 refs.]

In the Province of Corrientes, where these cases occurred, scorpion sting is regarded as mortal to children under three years, but as more or less trivial in adults.

One patient, a child of three years, stung on the foot, died six hours afterwards. Intense local pain was soon followed by collapse. Treatment was by antivenin (snake) and stimulants. The other was a girl of eight years. After the initial pain came restlessness and symptoms of collapse. Treatment by antivenin, camphor, caffeine and adrenalin. In neither case were there convulsions, paralysis or the other symptoms produced experimentally in animals.

H. Harold Scott.

Hase (Albrecht). Neue Beobachtungen ueber die Wirkung der Bisse von Tausendfüssen (Chilopoda). Beiträge zur experimentellen Parasitologie. 2. [**Effect of Bites of Millipedes.**]—*Ztschr. f. Parasitenkunde.* Berlin. 1928. Vol. 1. No. 1. pp. 76–99. With 3 text figs. & 1 double plate. [17 refs.]

A prolix account, in minute trivial detail, of the localized and superficial erythema and petechial haemorrhage and the smart caused by the bite of a European species of the familiar cosmopolitan genus of small centipedes known as Lithobius.

A. A.

Gibb (Douglas F.). **Anaphylaxis from Pollen introduced by a Bee Sting.**—*Canadian Med. Assoc. Jl.* 1928. Oct. Vol. 19. No. 4. p. 461.

In this case in a girl of 7 years a sting from a bee was followed immediately by a violent explosion of hay-fever which subsided at once with the exhibition of ephedrine. Since the child had never shown any susceptibility to hay-fever, and since also the local season of wind-borne pollen was past, the author concludes that the pollen was introduced by the sting of the bee.

A. A.

Gaminara (A.). Le venin de la larve de *Megalopyge urens.* [**Venom of the Larva of** *M. urens.*]—*Bull. Soc. Path. Exot.* 1928. Oct. 10. Vol. 21. No. 8. pp. 656–662. With 2 text figs. [2 refs.] [Hyg. Inst., Faculty of Med., Montevideo.]

The author describes the effects on rabbits, guineapigs, and white mice of the venom of the urticating bristles of the hairy caterpillar of the Megalopygid moth, *M. urens.* The bristles, which are implanted on tubercles having a definite arrangement, are connected with glandules. On man they inflict a painful urticarial or petechial dermatitis with ensuing numbness of the affected limb; and in severe cases there may also follow excitement, convulsions, dyspnoea, and vomiting. The guineapig and mouse are particularly sensitive to the venom; in them it causes convulsions, hiccough and intense dyspnoea, "auditory hyperaesthesia," and finally coma and death in convulsions—the heart still beating. The venom, in short, is not a mere vesicant, but is a true animal venom of the same class as the venoms of hymenoptera, spiders, scorpions, and snakes. The author's conclusions are confirmatory of those of other observers, particularly, as he himself states, of those of Foot for *Megalopyge opercularis* (*Journ. Exp. Med.* Vol. 35, 1924).

A. A.

TROISE (E.). Action pharmacodynamique du venin de *Latrodectus mactans.*—*C.R. Soc. Biol.* 1928. Nov. 9. Vol. 99. No. 31. pp. 1431–1433.

———. Sérum actif contre le venin de l'araignée *Latrodectus mactans.* [**The Venom of the Spider** *Lathrodectes mactans.*]—*Ibid.* pp. 1433–1434.

The author's experiments with the venom of the spider *Lathrodectes mactans* are confirmatory of the observations already recorded by others —except that they do not support the evidence of the haemolytic power attributed by HOUSSAY and NEGRETE. The venom causes intense pain, salivation and lacrimation, difficulty of breathing due to spasm of the bronchi, and (in lethal doses) death in asphyxic convulsions. Injection of 0·5 mgm. intravenously killed guineapigs of 600 gm. in less than two hours, and subcutaneously in twelve hours. Injection of 2 mgm., intravenously, into a dog caused, in addition to the other symptoms, loss of equilibrium and copious bile-stained vomiting, the animal being extremely weak on the following day.

The author obtained an efficient antivenom from rabbits immunized by a course of 14 gradually increasing doses (0·5 to 3·0 mgm.) of venom extending over 37 days.

A. A.

DUHIG (J. V.) & JONES (Gwen). **The Venom of the Stone Fish** *Synanceja horrida.*—*Mem. Queensland Museum.* 1928. June 16. Vol. 9. Pt. 2. pp. 136–149.

The authors describe (with figures) the anatomy of the dorsal spines of this Indo-Pacific fish and the histology of the venom-sacs connected with those spines, and they record their experiments with the venom ; they also give attention to certain other cutaneous glands and tubercles, the latter secreting a milky fluid which also may, perhaps, be poisonous.

The distribution and size of the venom-sacs is variable ; one specimen had none at all. A subcutaneous injection, into a guineapig, of 0·1 cc. of a 1 in 10 saline solution of the venom from a single fish caused, in the course of an hour, paralysis of all the limbs and difficulty in breathing—the effects lasting for more than 8 hours ; haemolytic effects were also observed. After recovery some degree of immunity was noticed.

An account follows of a case of a man who trod upon a stone-fish and was wounded in the sole by the dorsal spines. The penetration of the spines caused intense pain, followed by nausea and collapse. The man recovered sufficiently to drag himself a hundred yards to his home, where he fainted again. Seen 3 hours afterwards his foot and his leg as far as the knee were enormously swollen, his temperature was 102·4° F., and he was in agony. Some 44 hours afterwards he was removed to hospital still in agony, and there when the swelling was incised the whole skin of the foot and shin was found to be " the outer wall of a bag of pus." Subsequently a large patch of skin over the instep sloughed away.

Under appropriate treatment the patient made good progress until the 14th day after the accident, when he suddenly " felt as though a boa-constrictor " had got him round the waist " and was squeezing the breath out of him," and fainted with the pain. He recovered after treatment ; but stiffness and soreness about the epigastrium lasted for four days during which the patient had four fits of dyspnoea. The surgeon who treated the case seems to have thought that this terrible attack of dyspnoea was

not directly due to the venom, since he treated it with tetanus antitoxin; but the authors are not inclined to agree with this explanation. Altogether, the patient was incapacitated for more than four months.

A. A.

Duhig (J. V.) & Jones (Gwen). **Haemotoxin of the Venom of** *Synanceja horrida*.—*Australian Jl. Experim. Biol. & Med. Sci.* 1928. June 16. Vol. 5. Pt. 2. pp. 173–179. [9 refs.] [Hosp. for Sick Children, Brisbane, Queensland.]

Synanceia is one of several Indo-Pacific Scorpaenid fishes that have poison-glands in the skin enveloping their spinous dorsal fin. The authors have already reported that the poison in its effects is similar to cobra-venom and to curare, and in the present paper they describe its haemolytic properties.

A. A.

HISTORICAL.

KORTENHAUS (Friedrich). Das Wechselfieber in der Rheinprovinz und sein Verschwinden. [**Intermittent Fever in the Rhine Province and its Disappearance.**]—*Arch. f. Geschichte d. Med.* 1928. Vol. 20. No. 2. pp. 120–136. With 2 plates (1 map). [18 refs.] [Hyg. Inst., Univ., Cologne.]

During the 18th century and the first half of the 19th, the Rhine Provinces suffered from a series of epidemic waves of malaria recurring after intervening periods of quiescence. One of the worst of these outbreaks commenced in 1825 and flared up again each summer until 1828. Although the low-lying and marshy regions suffered most, in the plains the amount of sickness exceeded all records for the foregoing fifty years, and even mountainous regions unaffected within the memory of man were invaded. In Coblenz where the disease had been unknown for 100 years, one out of every three cases of fever was malaria. It is recorded in 1828 that no place in the whole plain of the lower Rhine was unaffected. After this year malaria receded until it was found only in its old endemic centres. From one of these, Aix-la-Chapelle, another epidemic started in 1834, spread far and wide, and in parts attacked a third of the population. The reports stress the peculiar obstinacy of the fever, and a larger dosage of quinine than usual was necessary to control it. Similar outbreaks recurred annually, beginning at the end of March, increasing rapidly, and commencing to die down from the end of August. By 1841, malaria had again abated, but a new wave, starting from Düsseldorf, spread over the country in 1843, and reached its maximum intensity in the following year. So usual was it for all the occupants of a house to be attacked at the same time that the populace suspected a spread by direct contagion. In 1845–46 cases were reported only from the endemic regions, and from this point the disease steadily declined until to-day the population of the Rhine provinces have even forgotten the once-familiar name "intermittent fever."

Stagnant water and marsh-land were held responsible for the prevalence of malaria, and both State and local authorities constantly took fresh measures to encourage drainage, and as a result, large tracts of marsh were converted into arable land and shallow lakes drained, as part of a deliberate policy which had still other effects for it improved agriculture and lessened poverty. Writing in 1844, Professor MARX, of Götting University, said: "If one labours continuously at the carrying off of stagnant water and prevents further collections; if in districts where rice and hemp cultivation are spoiling the air, care is taken to plant trees; if surface drains are kept clear, old town-moats filled in, and efforts made at the same time to provide clean drinking-water, good food and dwellings, the cold fevers [malaria] cease even when they appear to have acquired indigenous rights." And in the same year HEUSINGER suggested that what was called "miasma" might turn out to be a poison or a parasite.

W. P. MacArthur.

MÜLLER (Martin). Ueber eine Malariaepidemie zu Mannheim im Jahre 1761. [**A Malaria Epidemic at Mannheim in 1761.**]—*Arch. f. Geschichte d. Med.* 1928. Apr. 1. Vol. 20. No. 2. pp. 137–149. [Refs. in footnotes.]

In a volume recording his observations on medical science, Freidrick Casimir MEDICUS gives a most painstaking account of the great epidemic of malaria in Mannheim in 1761, where he was then Court and Garrison Physician. His detailed reports deal with the 1,228 soldiers who were treated in the military lazaret, of whom 14 died; civilian cases are mentioned only in passing as these were not under observation in hospital. MEDICUS described the epidemic with careful exactness in the belief that the malignant symptoms he encountered indicated a new form of intermittent fever.

The severe cases occurring in the late summer were *quotidiana* in type with sudden seizures of a convulsive nature. They "lost immediately all motion, hearing, speech, sight and feeling," and in these attacks he sees the special character of the outbreak. "In most there was an unnatural convulsion of the whole body, in some, however, only certain parts were affected"; trismus is noted, also rigidity of the neck, and opisthotonos. After 36 hours, he says, the condition passed, and a "clammy, sweet-smelling, cold sweat followed."

The epidemic began at the end of July, and lasted until the end of November. Weather reports are given for every day, and these record unusual and prolonged heat, to which, operating through the medium of the water in the town moat, he attributes the violence of the epidemic, and notes that the soldiers on the ramparts were the most liable to attack. Only influences of an inorganic nature arising from the water are considered as causative agents, and there is no mention of LANCISI's theory, published nearly 50 years earlier, of a connexion between water gnats and fevers.

In addition to the usual therapy of blood-letting, purging, etc., based on theoretical humoral pathology, MEDICUS administered cinchona bark with great vigour to all the malaria patients in the lazaret without exception, a startling and momentous innovation, for according to the accepted teaching, the bark was a dangerous remedy if employed for other than carefully selected cases. But MEDICUS chose to follow the guidance of his own experience rather than the theoretical preconceptions of others, to the great benefit of the sick in his charge, and to the enlightenment of his fellows.

W. P. MacArthur.

HILDEBRAND (Philipp). Zur Geschichte der Malariaformen. [**History of the Forms of Malaria.**]—*Muench. Med. Woch.* 1928. Jan. 20. Vol. 75. No. 3. p. 140. [6 refs.]

Although the author has never discovered the term "*tertiana duplex*" in any medical writings of antiquity or of the middle ages, he points out that it must have been in use at the period of the Renaissance, for it occurs in a Latin epistle dated October 6th, 1562. The letter, which he quotes in full, was written from Charlieu in France by Marius Antonius Muretus to Jacobus CANANO the physician, reporting his happy recovery from an attack of "*tertiana duplex*," but milder, he says, than that for which CANANO had treated him three years before.

The type of malaria indicated by this name was known to the ancients as "half three-day fever" (*hemitritaeus*), and was considered an

especially severe variety. It may be remembered, too, that when poor Sir John Falstaff lay a-dying in Mistress Quickly's tavern, he is recorded, on the somewhat uncertain testimony of this lady, to have been so shakéd of a burning quotidian tertian that it was most lamentable to behold.

W. P. MacArthur.

Honig (P. J. J.) & Swellengrebel (N. H.). Bijdrage tot de geschiedenis der malaria in Nederland, vierde mededeeling. [**Contribution to the History of Malaria in Holland.**]—*Nederl. Tijdschr. v. Geneesk.* 1928. Jan. 7. 71st Year. 1st Half. No. 1. pp. 38–47. [Numerous refs. in footnotes.]

Continuing their series of articles on this subject (see this *Bulletin*, Vol. 22, p. 809; Vol. 24, p. 344) the authors searched for articles on malaria the numerous medical periodicals which were published in Holland for longer or shorter periods of times in the first half of the 19th century. Etiological knowledge and diagnostic methods were not much more advanced in those days than they were in the 18th century; medical thought was still greatly under the influence of Galen's humoral pathology. The unity of miasmatic fevers, caused by a single agent, was universally accepted.

Successively the authors deal with: (1) Descriptions of epidemics; (2) the diagnosis; (3) the treatment; and (4) the Zealand fevers.

The epidemics mentioned in the literature (Groningen, 1826; Guelders, 1831; Hellevoetsluis, 1834; Bois le Duc, Lekkerkerk, 1837; Arnemuiden, 1843; Groningen, 1846) have certainly for the most part been epidemics of different affections appearing at the same period under the influence of various concurrent circumstances ("swamp nosocoenosis" as the authors called this epidemiologic unity in the previous article).

Differential diagnosis of intermittent fevers was still in a primitive stage; the differential diagnosis "ex juvantibus" by means of quinine administration could only serve to make the confusion worse. Malaria was believed to have a very proteiform character and accordingly "made the scapegoat for professional doubt," which it unluckily has remained here and there till the present time.

Little uniformity in judgment existed as to the efficacy of quinine, but the confusion of malaria with other diseases explains much in this respect. Later on quinine was more generally recognized as a useful drug. Not much disagreement appears to have existed as regards the dosage, 1 gram being generally administered.

The epidemic fevers in Zealand were generally called intestinal affections; they were sometimes epidemics of benign enteritis, sometimes enteric or dysentery. The high mortality in Zealand had nothing to do with malaria.

W. J. Bais.

Soliani (Giovanni). La malaria nel Mantovano. Storia e stato attuale. [**Malaria in Mantua.**]—Supplement to *Riv. di Malariologia*. 1928. Vol. 7. New Ser. No. 3. 90 pp. With 1 map & 3 text figs.

This essay opens with a brief history of Mantua in ancient times with many references which include the names of Livy, Virgil, Pliny and Tacitus. Mantua, in Lombardy, on the Mincio is a strongly fortified

city with river, artificial lakes, canals and swamps as additional defences. These latter, while affording protection against human foes, encouraged the mosquitoes and made the city and surrounding country very unhealthy. Dr. Soliani gives a full description of the topography and hydrography of the district in the earlier centuries and at the present time. In Chapter V we find early documentary evidence of malarial fevers in Mantua. Lodovico Gonzaga writes of *febres tertianas duplas* in 1369 and there follows a table of deaths from malarial fevers from 1496 to 1586; *tertian, quartan* and *double quartan* are mentioned, and in four instances enlarged spleen is noted in the record. Accounts of " epidemics " of malaria are given for the 15th, 16th, 17th and 18th centuries. For the later years of the 19th century we get a table giving the verified number of cases in Mantua from 1890 to 1900. The number varied from 1675 in 1892 to 1998 in 1900.

Part II of Dr. Soliani's work deals with recent times and present-day scientific methods. No species of anopheles are mentioned except "*A. claviger* or *maculipennis*." The organization of the provincial administration for fighting malaria is fully described with suggestions for improving local conditions.

J. H. Tull Walsh.

i. Celli (Anna). Die Bedeutung der Malaria für die Geschichte Roms und der Campagna im Altertum und Mittelalter. [**The Significance of Malaria for the History of Rome and the Campagna in Antiquity and the Middle Ages.**]—*Abhandl. a.d. Gebiete d. Auslandskunde. Hamburg. Univ.* 1927. Vol. 26. (D., Med. & Vet. Vol. 2). [Festschrift Nocht.] pp. 49–56. With 4 figs. on 2 plates & 1 map. [34 refs.]

ii. Celli-Fraentzel (Anna). Die Malaria im 17. Jahrhundert in Rom und in der Campagna im Lichte zeitgenössischer Anschauungen. [**Malaria in the 17th Century in Rome and the Campagna, in the Light of Present-Day Conceptions.**]—*Arch. f. Geschichte d. Med.* 1928. Apr. 1. Vol. 20. No. 2. pp. 101–119. [Refs. in footnotes.]

With the publication of the late Professor Angelo Celli's great posthumous work on malaria in Rome and its environs [see this *Bulletin*, Vol. 24, p. 411] an enormous accumulation of material relating to the subject—the collections of a lifetime of ardent effort—was placed at the disposal of future students. It was only to be expected, therefore, that this vast treasury of information would be drawn upon and utilized further by his heirs and successors. The two papers under review are, in fact, based wholly upon his researches, and are little more than annotated extracts—in German—from his larger work.

The titles of the papers explain their scope sufficiently, and as their authoress is the widow of the original investigator, and herself a German by birth, it may be taken for granted that his views are here expressed adequately though in language not his own. But to review these essays in detail would be superfluous, since they contain nothing of importance that is not more fully handled in the work from which they are derived. To those who cannot consult the original sources, however, they may be recommended as authoritative expositions of certain aspects of Angelo Celli's views on malaria considered as a factor in Roman history.

Clifford Dobell.

WILLIAMS (Herbert U.) with the collaboration of RICE (John P.) & LACAYO (Joseph Renato). **The American Origin of Syphilis with Citations from Early Spanish Authors collected by Dr. Montejo y Robledo.**—*Arch. Dermat. & Syph.* 1927. Dec. Vol. 16. No. 6. pp. 683–696. [29 refs.]

The purpose of this most interesting paper is to present, for the benefit of Americans who do not read Spanish, some evidence, published in that language in 1881, for the American origin of syphilis and the introduction of the disease into Spain by the ships' companies of Christopher Columbus. The authors begin with the old story that the disease first appeared in Europe in 1495, in French and Neapolitan armies contending before Naples, and, as a result, became known, reciprocally, on the one side as the "Italian disease," and on the other as the "French disease"; the next step is to show that the Neapolitan army was reinforced from Spain; and the last step brings us to evidence purporting that the disease had been brought into Spain just before by sailors infected in the New World. This evidence, which has already been made known in England, was brought forward in 1881 by MONTEJO y Robledo, and here consists of a brief abstract of MONTEJO's paper and translations of passages quoted by MONTEJO from five relevant writers, either contemporary with or not much later than COLUMBUS, in support of the main argument; those writers being Gonzalo Fernandez OVIEDO y Valdes (1478–1557), Bartolomé de LAS CASAS or CASAUS (1474–1566), Bernardino DE SAHAGUN (1499–1590), Francisco HERNANDEZ (1514–1578), and Ruy Diaz DE ISLA (1539).

From the study of contemporaneous dictionaries MONTEJO assured himself that the American Indians had words equivalent to the Spanish word *bubas* by which syphilis is designated in the documents that he quotes, although as the present authors observe there is here a bare possibility of confusion with yaws. Their first witness, OVIEDO, states, in his *Historia general y natural de las Indias*, that he was present in Barcelona as a page when Christopher COLUMBUS returned there from his first voyage of discovery [1492–93], and also that in Castile he conversed with officers and others after their return in 1496 from the second voyage: the gist of OVIEDO's story is that in the island of Haiti there was "a horrible contagious disease," *buas*, a disease for which specific indigenous remedies were well known, which was very common among the Indians, and that this disease was transmitted to some of the Spaniards who sailed with COLUMBUS, and, being spread in Spain at first "among low persons," afterwards "extended among the people of higher rank"; and, furthermore, that some among the Spanish army sent to the relief of Naples were "touched with the disease," and thus it was communicated "through the women of bad conduct" to the Italian and French armies there. LAS CASAS, who lived in tropical America for many years, states, in his *Historia de las Indias*, that an indigenous "disease of the *bubas* which in Italy is called the French malady"—a disease of immemorial antiquity, for which "divine Providence" had provided a proper medicine—is very common among the Indians, who, however, "were affected by it as little as if they only had smallpox"; he speaks of it as "a thing well verified" that the Spaniards acquired the disease, and he has little doubt that it was in this way that the infection spread to the armies at Naples as already explained. DE SAHAGUN, in his *Historia universal de las Cosas de Nueva España*, speaks of two kinds of *Bubas* as occurring in Mexico, one

" very filthy," the other " of less severity," of which he gives the native names and those of the native remedies. HERNANDEZ, who was physician to Philip II and was sent to Mexico to study the natural history of the country, described, under its native name, the plant used there for the treatment of the *bubas*, the disease, synonymous with " French or Neapolitan malady," which " came out of these West Indies," where it has " a special native and ancient name." DE ISLA, author of a treatise on the new disease commonly called *bubas* in Spain and French and Italian disease elsewhere, but which he prefers to call " serpentine " malady because it affrights the imagination like the sight of a serpent, says that it first appeared in Europe in 1493, at Barcelona, having been introduced from the island of Hispaniola by the ships' companies of COLUMBUS. The sailor-men attributed it chiefly to " hardships of the sea." DE ISLA also repeats the story of its further spread by infected members of the Spanish contingent sent from Spain in 1494 to assist the Neapolitans against the French.

The paper deals with some minor questions, but for these and many other reasons it would be superfluous further to commend it for careful perusal.

A. Alcock.

EBSTEIN (Erich). Ein Brief von Otto Obermeier, dem Entdecker der Rekurrensspirochäte. [**A Letter from Otto Obermeier, the Discoverer of the Relapsing Fever Spirochaete.**]—*Deut. Med. Woch.* 1928. Mar. 2. Vol. 54. No. 9. pp. 360–361. [1 ref.]

Otto OBERMEIER was born at Spandau in 1843, qualified in medicine in 1866–7, was attached as VIRCHOW'S assistant to a hospital in Berlin, and when 24 years of age made his discovery, not announced to the world till February, 1873, when his paper " Die Entdeckung von fadenförmigen Gebilden im Blut von Rückfallfieberkranken " appeared. The contributor of the note says that OBERMEIER was the first to see living agents of disease in the blood of man. The letter, to his brother and sister, is concerned with domestic detail, but contains a passage about the " spirochaete." After stating that he has found them also in mucus about the teeth he says that they are difficult to see in the blood but so characteristic that one can make the diagnosis at home without seeing the patient. In August, 1873, cholera broke out in Berlin and OBERMEIER, who plunged into its investigation, succumbed to it on the 20th of that month.

A. G. B.

JOHNSSON (J. W. S.). **Notes on the Black Death in Danish Folklore and Tradition.**—*Janus.* 1928. Nov. Vol. 32. No. 11. pp. 365–377. [47 refs.]

A Danish schoolmaster, Kristensen by name, having spent his time in wandering over the country collecting folklore and traditions, left behind him many publications dealing with these affairs. Dr. Johnsson has assembled Kristensen's scattered references to plague, and mainly from these notes, though drawing on other sources as well, he has written an account of the Black Death as it was remembered in Danish tradition. Like Scotland, Denmark did not feel the full weight of the pestilence until 1350, but its virulence was unabated, as these chronicles amply testify.

Large tracts of country, it is recorded, were depopulated to such an extent that the survivors had difficulty in finding one another. Bonfires were lighted on the hills at night to attract attention; church bells were rung in the hope of a response from places where some person was still alive; and from high ground watch was kept for smoking chimneys. People without the vestige of a claim—except that of being alive—took possession of whole villages, and even of manors, the owners and all their blood relations having perished. There were not sufficient survivors to till the soil, and large areas of cultivated land reverted to forest.

Except for one reference to a black spot on the hand, and another to three red spots on the arm, the author has found no mention of symptoms; admitting his unfamiliarity with plague, he suggests that these descriptions refer to buboes, but a carbuncle, and tokens, respectively, would appear a more likely interpretation.

Owing to the multitude of deaths, and the short duration of the disease, most of those who perished died unfortified by the rites of the Church. In Northern mythology, Odin brought sleep to Brunehild by means of the hawthorn, and from some memory of this ancient belief the graves of the plague victims were planted with hawthorn to give their perturbed spirits eternal rest.

W. P. MacArthur.

ZUBRICZKY (Aladar). Histoire de la grande épidémie de lèpre en Europe. [**History of the Great Epidemic of Leprosy in Europe.**]—*Matériaux pour l'Étude des Calamités.* 1926. Oct.–Dec. Vol. 3 & 1927. July–Sept. & Oct.–Dec. Vol. 4. Nos. 11, 14 & 15. pp. 233–243; 133–148; 231–240. [Refs. in footnotes.]

The author of these papers, a professor of theology, gives us an account of what is described as the great epidemic of leprosy in Europe, based on a mass of material gathered from old chronicles, and from monastic and other ecclesiastical records, all set out with a fine display of learning. His account, however, is vitiated in many parts, and rendered suspect in others, for he accepts every mention of the word *lepra* and its numerous congeners as equivalent to the precise usage of to-day; whereas these terms were employed with such a diversity of meaning that no exact interpretation is possible unless sufficient additional evidence can be found in the context.

It is unquestionable that true leprosy existed in every country in Europe, but only some small and uncertain proportion of those called lepers can have suffered from an infection with Hansen's bacillus, for almost any disease characterized by chronic scaly or ulcerative skin manifestations was in general regarded as leprosy. The idea which "*lepra*" conveyed to the ancient mind is clearly shown by the popular word commonly employed as a translation in Old English writings, "*hreofla*," that is, scurf; and the scriptural epithet *ulcerosus*, applied to Lazarus who lay at the rich man's gate, was sufficient not only to label him as an unquestioned leper, but also to furnish a new name for those afflicted with his supposed infirmity. Moreover, the word leprosy was employed for maladies not leprous even in the comprehensive acceptance then usual—"the leprosy that is called small-pox" of the *Annals of Clonmacnoise*—and also to indicate bodily affliction not the result of any disease; in one familiar passage in Isaiah, said by

theologians to refer to Jesus of Nazareth, the "afflicted" of the authorized English bible is rendered "leprous" in versions as late as that of John Wyclif.

Again, cutaneous diseases of animals, and blight affecting crops, were called leprosy, and the confusion in nomenclature went so far that even "elephantiasis"—a word considered by Sir James Simpson positive proof that true leprosy is referred to!—came to be used as a synonym of mange, as in de Blundevil's treatise on diseases of the horse, where the chapter on mange is headed, "The Leprosie or uniuersall manginesse, called of the old writers *Elephantia.*"

It is in keeping with the author's uncritical method that the famous leper-hospitals of Armagh should figure in his pages, though here, by still another curious error, these imaginary institutions are transported to Innisfallen—the *Annals of Innisfallen* being the name of the chronicle supposed to record their existence. The reviewer has explained elsewhere the origin of this strange legend: O'Conor, misunderstanding the original Erse text, translated the archaic "*derthightibh*" (oratories) by the Greco-Latin "*nosocomiis*" (hospitals), and Belcher in turning O'Conor's Latin into English, glossed *nosocomiis* by "leper-houses"; and from this double mistake there arose these fabulous foundations—a pretty instance of history in the making, and typical of much that is asserted regarding leprosy in old times.

If Dr. Zubriczky had approached his subject in a more critical spirit, his recondite researches would have been of the greatest value to students of this branch of history; as it is, through his unquestioning acceptance of the written word, they cannot but mislead those who trust themselves to his guidance.

W. P. MacArthur.

BAUMANN (E. D.). Ueber die Hundswut im Altertume. [**Rabies in Antiquity.**]—*Janus.* 1928. Apr. & May. Vol. 32. Nos. 4 & 5. pp. 137–51; 168–85. [Refs. in footnotes.]

It is not remarkable that the history of a disease in which the sequence of events is so clear-cut, and the incidents themselves, from the primary attack of the mad dog to the terminal catastrophe, are so dramatic in their intensity, should have its roots in the earliest literary records.

Baumann, in a scholarly review, traces this history as it appears in classical literature. The only criticism which the reviewer has to offer is that it would have been easier to follow the record if a scale of reference had been supplied in the form of dates.

Although HOMER refers to mad dogs in the eighth book of the Iliad, and in a number of other verses uses the term λύσσα with reference to the frenzy of the gods, the earliest Greek writers do not refer to the symptoms and the treatment of rabies. According to PLUTARCH the first definite reference to hydrophobia appears in the time of Asclepiades. THEOCRITUS, AESCHYLUS, SOPHOCLES, EURIPIDES, ARISTOPHANES and XENOPHON refer to the madness of wolves and dogs, and ARISTOTLE in his "Historia animalium" describes rabies as a disease of dogs which causes furious symptoms, and which is transmissable by biting to all animals with the exception of man. It would thus appear that the disease in man had not been identified with the disease in the dog, owing probably to the different clinical features presented in the two cases. In the time of HIPPOCRATES a hydrophobic patient was considered to be suffering from a form of madness, either

melancholic (EUDEMUS) or maniacal (ARISTOTLE). Much stress was laid upon the symptoms of unrest and fear. The disease was one of the soul and not of the body. It might arise from a dyscrasia of the body fluids (black bile) as well as from the bite of a rabid animal. As a consequence of this view the condition was ascribed to demon possession. Even PLINY recommended the sacrifice of a red dog during the " dog days." The connexion between hydrophobia and the bite of a mad dog was probably first recognized by the Alexandrian school of HEROPHILUS, and ANDREAS of Karystos (215 B.C.) was also aware of the relationship. Whether arising as the result of a dyscrasia or from the bite of a rabid animal the symptomatic features were the same —viz., a drying of the air passages and the stomach, leading to a disposition to cramps, and a fear of water ; cold clammy perspiration ; barking and howling like a dog ; and finally death. The treatment was the prevention of draughts of air, the withholding of water, the administration of honey soaked in water, the application of poultices and ointments to the breast and abdomen. Amongst drugs given were treacle, hellebore, and colocynth. CELSUS in his encyclopaedia goes into greater detail, and describes methods of cauterizing the bite. When symptoms of hydrophobia declared themselves he advised the immersion of the patient in a pool of water, pressing him under the surface until he swallowed water, and then raising him out of the water intermittently. In this manner it was claimed that both thirst and fear of water were alleviated. There was, however, a risk that the patient might die in clonic spasm. In the interval, he was placed in a warm bed, and treated with opium, cardamoms, castor oil, and a number of other drugs. This water cure again came into vogue in the sixteenth century, but was opposed by PARÉ. In this connexion it is interesting to be told that in the ruins of Ostia an altar has been discovered bearing an inscription stating that it had been erected in the year 199 A.D. by one Amnion, in honour of " the holy Nymph " who had cured him of a severe sickness. Carvings round the base of the altar show a dog running away and a man prone on the ground calling for help. From the inscription it appears that Amnion believed that he owed his recovery to a water cure.

PLINY believed that rabies was a disease of the " dog days " ; as a preventive he recommended that the excreta of hens should be mixed with the dogs' food. He believed that he could prevent the onset of symptoms in young dogs by excising the worm-like cartilage at the base of the tongue, which had traditionally been mistaken for an actual worm. As a curative agent he recommended the administration of the root of the wild rose.

Various medicaments were administered by later writers, mostly in the form of plasters.

Throughout the middle ages there is little evidence of advance in knowledge regarding rabies, and it was not until 1804, when ZINKE succeeded in infecting a healthy dog with the saliva of a rabid dog, that rabies was proved to be an infectious disease. Finally, in 1881, PASTEUR succeeded in preventing the onset of rabies by vaccinal treatment.

Such, in brief, is the historical record so ably set forth by Baumann, a record which shows how near to the surface the truth lay, and how the clarity of vision of the older writers was obscured by superstition in later times. The contagiousness of the disease was recognized before the commencement of the Christian era, although actual proof by

transmission was deferred until the beginning of the 19th century. That the causative agent was present in an invisible form in the saliva of mad animals was accepted some 2,000 years ago, and to-day, when we are able to see particles of matter some thousand times as small as were just visible in those days, the causative agent is still invisible. Our technical advantages have aided us in a quantitative sense, and only in that respect have we come nearer to the truth.

A. G. McKendrick.

BUTLER (C. S.). **Presidential Address.**—*Amer. Jl. Trop. Med.* 1928. Sept. Vol. 8. No. 5. pp. 363–370.

The author makes fun of the belief that syphilis had its origin in America; he notes that leprosy, syphilis, gonorrhoea, chancroid and yaws were not differentiated till long after Columbus's time. He notes the fallacy that mercury will not cure yaws and says that United States Navy experience in Guam and Haiti has given this a complete "knock-out." With reference to the Oxford Dictionary, he writes:—

"By means of the dated quotations from the medical literature it is possible to run down many of our medical fallacies and to place the responsibility for them where it properly belongs. It is rare indeed that a term such as "influenza" or "yaws" can show an uncontaminated record as far back as three hundred years. A term will usually become more inclusive as it courses backward. Thus, when the term "leprosy" was incorporated into English from the Greek, it included several conditions which we now know are entirely distinct from true leprosy. So also with a great number of terms used in medicine."

The word syphilis was first used in English in 1718.

A. G. B.

LANE (John E.). **Bonomo's Letter to Redi. An Important Document in the History of Scabies.**—*Arch. Dermat. & Syph.* 1928. July. Vol. 18. No. 1. pp. 1–25. With 20 figs. [3 refs.]

Drawn by BEESON's sketch of the history of the study of the itchmite (see this *Bulletin*, Vol. 25, p. 184), the author gives here a transcription of the original letter to REDI in which BONOMO described the itchmite and his observations of its life-history. He also draws attention to a paper published in the *Philosophical Transactions of the Royal Society*, 1703, Vol. 23, in which Dr. Richard MEAD gave an abstract of the important part of BONOMO's letter, and he adds a transcription of the original paper as published.

A. Alcock.

AGRAMONTE (Aristide). **A Review of Research in Yellow Fever.**—*Ann. Intern. Med.* Ann Arbor. 1928. Aug. Vol. 2. No. 2. pp. 138–154. [20 refs.]

A historical account of yellow fever investigations with special reference to the earlier work and the way in which the method of transmission was discovered.

E. Hindle.

PROVERA (Giovanni). Terapia antica dell' ofidismo. [**Past Methods of Treating Snake-Bite.**]—*Arch. Ital. Sci. Med. Colon.* 1927. Aug. & Sept. Vol. 8. Nos. 8 & 9. pp. 452–468; 518–532. [Inst. of Trop. Path., Univ., Bologna.]

[This article, though long, is of great interest, historically in particular, as a study in superstition, charlatanism and credulity. It is a pity that the matter has not been grouped, for its discursive character increases greatly the difficulties of abstraction, and a bibliography added to the original paper would much enhance its value, as the references are many.]

Sucking of wounds caused by snakebite seems to have been the privilege [?] of certain families in the time of Cleopatra, and is said to have been very remunerative.

Treacle [not the modern golden syrup] by its derivation was originally used for the bites of animals and a short step led to its employment for snakebites. Though attributed to Mithridates, the Mithridatic remedy contained over 70 different ingredients; Andromachus went one better by adding "viper powder," and others added more from time to time; Quergetano's "treacle" contained over 100 ingredients and "triaca celeste" yet more. Later, the number was reduced to thirty-seven. Evidently imitations were numerous, for in 1150 Bernardo wrote that all those prepared at Salerno were useless and fraudulent because they did not contain "orobo," but a substitute "Robelia." The mixture used at the Salerno school is recorded thus:

Allea, nux, ruta, pira, rafranus et theriaca,
Haec sunt antidotum contra mortale venenum.

[Judging by present-day circulars, the nostrum vendors of to-day have changed very little from those of the twelfth century.] Huel's remedy was arsenic mixed with treacle, placed in cheese and kept till it turned black. Scepticism regarding treacle came in when Theodosio of Parma began experimenting and found it ineffectual in pigeons. Guido Patin followed, expressing total disbelief in it, averring that the only safe treatment was free and deep scarification and "application of potent absorbing medicaments." Paré, however, when bitten by a viper, bound up the wound after applying "old treacle" and was rapidly cured. Anyway, faith in it prevailed for a long period. The only genuine preparation containing "viper flesh" was imported wholesale into Egypt (plenis navibus). The best grade contained the head, liver, heart, brain, blood, bile and fat of the snake made into a drink with broth—"Viper wine" or Snake-broth." The underlying idea was clearly the homoeopathic notion of *similia similibus curantur*. Analogously, "oil of scorpions" was used for their stings, and pounded worms as an anthelmintic. Redi held that the best treatment was a ligature above the wound, and crude notions of specificity came in when he demonstrated that "scorpion oil" would not cure snakebite. Nicandro followed with a simple ointment containing horseradish, asphodel, leaves of savin, the brain of a hare, and other ingredients, but combined with this it was advisable to catch a viper and sprinkle its head with human saliva which "discourages the animal and attenuates its poison." [In the West Indies at the present day the first thing a native does before trying to catch and kill a scorpion is to spit upon it.] Redi followed this out and "benefited much." Valisnieri refers to the wonderful effects of intravenous injection of sal volatile made from stags' horn, mixed with human and viperine urine.

Antidotes in use among the Navajo and Hupi Indians were snake-stones of lime and decalcified bone. Gerolamo Cardano placed great faith in precious stones, as prophylactic rather than curative, and the use of amulets was a short step from this; specially efficacious were crocodiles' teeth, pieces of snake-skin, or small bags of it containing charms, magic formulas, or a snake-stone.

Another infallible remedy was the horn of a unicorn, but this was very expensive, only kings, princes, chief nobles, and a few churches being able

to afford them. The King of Polonia had one, also the Duke of Mantua, and Pope Julian III, and there was one at St. Mark's, Venice. Baccio makes it quite clear that the unicorn was a species of wild ass having a white body, red head, and black eyes, in order that the purchaser might be sure of getting the genuine article which was a true antidote, and not a spurious imitation. Drinking cups were made of it to neutralize any poison inadvertently taken, and amulets of it inlaid with precious stones were worn, and scrapings were taken internally. If precious stones were too expensive, it was mixed with precious metals, especially gold, and applied locally. [The recent treatment with gold chloride may thus be a repetition of history.]

Various earths have been made up into lozenges for snakebite in Egypt, Lesbos, Lemnos, Elba, Asia Minor, and elsewhere from time to time with pecuniary success to charlatans.

The Bezaar stones of Rhazés held the field for a long period as infallible. It is recorded by Bontius that a King of Persia kept for himself all such stones collected in a particular region where a plant, Hermodactyl, imparted to the stones its wonderful properties. Like the unicorn horn, cups were made also of these stones.

There are many other remedies mentioned of which the following are too important to be omitted altogether. Music, with incantations, naturally would be employed from snake-charming in a superstitious age. One found very effective for viper bites was the following : " Ego te incanto, ad honorem Dei et Virginis Mariae, de serpe, de scorpion, de tarantola, de saiton, de laxerton, de scorfano, de lupo, de cane rabioso," accompanied by invocation to the Four Evangelists and certain Saints ; speedy cure resulted.

Attalus Plaster (attributed to Attalus III, King of Pergamos) consisted of hyoscyamus, aconite, hellebore, pounded in a copper mortar with white grapes and left till no more copper was taken up ; the product was then concentrated and mixed with turpentine, myrrh, nitre and other substances.

Frog-Balsam (Balsamo de ranis) of Vigo's Plaster, was for a time in vogue. It contained among other things frogs, worms, viper-fat, laurel and mercury, and, without the animal constituents, was used also for syphilis [probably on account of the mercury].

Less romantic, but worthy of note, is the fact that Sir Almroth Wright's treatment of wounds was foreshadowed by Cardano and Paracelsus, who strongly recommended the local application of salt, while Valisnieri is said to have used potassium permanganate as a constituent of his remedy for snakebite.

H. Harold Scott.

Allbutt (Clifford). A Note on Indian Medicine.—*Indian Med. Gaz.* 1928. Feb. Vol. 63. No. 2. pp. 53–55.

YELLOW FEVER.

HINDLE (Edward). **An Experimental Study of Yellow Fever.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Mar. 9. Vol. 22. No. 5. pp. 405–430. With 1 text fig. [18 refs.]

The author describes the results of the investigations which he has been carrying out at the Wellcome Bureau of Scientific Research in London. The virus employed was the West African one previously referred to (see this *Bulletin*, Vol. 25, p. 539). It was maintained by passages in *Macacus rhesus* and the mosquito *Aëdes aegypti*. It is interesting to note that though the virus in the first place had been obtained from a very mild case of yellow fever at Dakar it proved to be highly virulent to monkeys. As a routine method of passage in the monkey the inoculation subcutaneously of 0·1 gram of liver ground up in normal saline was adopted. This constantly produced a fatal infection, the course of the disease being that described by the Rockefeller Commission in West Africa and other observers. It was noted that the liver, spleen and kidneys of animals which had died of the disease varied as regards virus content between 1,000 and 100,000 lethal doses per gramme, the average being 10,000. The amount of virus inoculated had little or no effect on the subsequent infection except in cases in which the dose was 0·0001 grams when the incubation period was prolonged. In two instances this dose produced no sign of infection, but the animals were found to have acquired an immunity, as evidenced by their resistance to subsequent inoculations of large quantities of virus. The virus appears to multiply in the animal's body till its death, thus differing from its behaviour in human beings in whom it disappears in three days not only from the blood but, according to ARAGÃO, probably from the organs also.

Frozen virus maintains its virulence for eighteen days after which it acts as a vaccine. Similarly, virus completely dried in vacuo and kept absolutely dry, remains virulent for at least three months, after which its virulence diminishes till it ceases to be infective, but nevertheless confers an immunity.

Transmission from monkey to monkey was readily effected by the mosquito *Aëdes aegypti*. Of six monkeys infected by the bites of an African strain of this mosquito two recovered from the disease. In one case a fatal infection resulted from the bite of a mosquito which lasted only two to three seconds. One mosquito which had fed on an infected monkey 24 days before was dissected. One salivary gland was inoculated into one monkey and the gut contents, excluding the proboscis and oesophagus, into another. Both animals died of the disease. The contents of mosquitoes were proved to be infective three and eight days after an infective feed and before they had become capable of transmission by the bite. It was also shown that the abdominal contents of mosquitoes were infective thirty-five days after they had ingested virus. The severed legs of two mosquitoes failed to produce infection, while the abdominal contents did do so. This may indicate that the virus, though present in the organs, may be absent from the coelomic fluid. In view of the possibility of the spread of yellow fever to the Orient the experiments with an Indian strain of *Aëdes aegypti* are of importance. This strain was found to be capable of transmitting the disease though there was some evidence, admittedly not conclusive, that it might not be so efficient as the African strain.

On the subject of immunity mention is made of the well-known fact that an attack of the disease is followed by a lasting resistance to further infection. Furthermore, it is known that the serum of recovered cases will protect monkeys against infection. This fact has made it possible to recognize as yellow fever cases which on clinical grounds alone might not be suspected. The author and his assistant, after illnesses of undetermined nature, were found to have had atypical infections, as proved by the protective property of their sera after recovery.

As regards immunity in monkeys, it was noted that the liver and spleen of recovered animals which were removed from the body, after perfusion with Ringer's solution to remove all trace of blood, were capable of vaccinating against the disease. In certain animals which had been hyper-immunized by repeated inoculations of infective liver the inoculation of a large dose of infective liver was followed by rapid death in 48 hours from what appeared to be a peculiar type of anaphylaxis.

On the subject of vaccination the results previously described (this *Bulletin*, Vol. 25, p. 539) have been confirmed and extended. In consequence of the variation in the virus content of the liver of monkeys which die of the disease, it was decided to use for vaccine purposes only those livers which contained at least 10,000 lethal doses per gram. On two occasions vaccines prepared from livers with less than this amount did not give protection in a dose of 1 cc. It was found that the best method of obtaining virus from the liver was by cytolysis. To effect this ground up liver is mixed with 9 per cent. sodium chloride. After some hours in the ice chest sufficient distilled water is added to reduce the salt concentration from 9 per cent. to 0·9 per cent. The sudden change in osmotic pressure causes the cells to swell and burst, liberating the contained virus, the virulence of which appears to be unaffected. It is pointed out that the protection afforded by formalinized vaccine is quite as good as that given by the phenol glycerine vaccine. The amount of formalin now recommended (2 parts per 1,000 to a 20 per cent. suspension of liver and spleen) is double that mentioned in the earlier paper. It was further shown that the phenol glycerine vaccine was potent when dried after removal of the glycerine by dialysis. Attention is drawn to the fact that the test which was employed to determine the potency of the vaccines was a particularly severe one. This consisted in giving 1 cc. of vaccine and ten days later not less than 1,000 minimal doses of virus in a saline suspension of liver. The interval of ten days is hardly sufficient to allow of the full development of immunity. It has been shown that the immuniy conferred by vaccination will persist for at least four and a half months.

C. M. Wenyon.

Mouchet (R.). Rapport sur l'épidémie de fièvre jaune dans le Bas-Congo (Boma et Matadi). [**A Report on the Yellow Fever Epidemic in the Lower Congo (Boma and Matadi.**)]—*Ann. Soc. Belge de Méd. Trop.* 1928. Sept. Vol. 8. No. 2. pp. 219–232.

An interesting and detailed account of the outbreak of yellow fever at Matadi and Boma in December, 1927, and January, 1928. This seems to be the first epidemic of the disease recorded from the Congo, and from a history of the cases there is little doubt that the infection

was introduced by steamer from Dakar. At Boma there were only three cases, two imported and one local, and no natives were affected. At Matadi there were 19 cases amongst Europeans (and 3 uncertain) : 8 recovered and 11 died. Twenty natives became infected, of whom 5 recovered and 15 died. There were no cases amongst the 53 European children, although there were 5 cases among 138 women, and 17 amongst 407 men.

The high mortality amongst the natives is noteworthy, as it shows that they do not possess any more natural resistance to this disease than Europeans. When any marked discrepancy exists between the mortality of Europeans and natives, it indicates the existence of an endemic area in which the natives have become immunized as the result of previous exposure to infection.

The situation at Matadi is considered somewhat unsatisfactory as it is difficult to control the movements of the natives in a port of this nature, and the occurrence of the cases recorded above indicates the danger of the disease having become established in the native population and the possibility of it being carried on to the next rainy season.

E. Hindle.

FRAGA (Clementina). **The Yellow Fever Epidemic at Rio de Janeiro.**—*League of Nations Monthly Epidemiol. Rep.* 1928. Oct. 15. Vol. 7. No. 10. pp. 375–378. Also in *Public Health Rep.* 1928. Nov. 23. Vol. 43. No. 47. pp. 3079–3083.

——. Quelques notes sur l'épidémie de fièvre jaune à Rio de Janeiro.—16 pp. With 6 plates. 1928. Rio de Janeiro. Also in *Bull. Acad. Méd.* 1929. Jan. 15. Year 93. 3rd Ser. Vol. 101. No. 2. pp. 82–89. With 6 text figs.

——. Sobre o surto epidemico de febre amarella no Rio de Janeiro. —*Bol. Oficina Sanitaria Panamericana.* 1928. Dec. Vol. 7. No. 12. pp. 1535–1546. With 7 figs.

In 1908, as a result of an intensive campaign since 1903, yellow fever disappeared from Rio de Janeiro, and since then only very rare cases have been recorded. In May, 1928, it reappeared in the city and 108 cases were recorded during the summer as follows : 1 in May, 55 in June, 40 in July, 8 in August, 4 in September. The first and second cases were soldiers from the barracks and confirm the suspicion that the disease was introduced by recruits from endemic foci in the north of the country. 78 per cent. of the cases occurred in foreigners, who only constitute 21 per cent. of the population in Rio. Moreover, the case fatality among foreigners, 62 per cent., was nearly double that among natives, 32 per cent., indicating the presence of a much greater resistance to yellow fever amongst the latter. The general mortality rate was 55·5 per cent. According to Dr. S. LINS, who gives a description of the symptoms of the disease, clinically the cases fell into three groups :—

1. *The attenuated or renal form.* After two or three days of general sickness, with ocular congestion and vague discomfort, the local reaction sets in with sudden albuminuria, accompanied by hyaline and granular casts, and in grave cases of anuria by occasional blood cells. The disease may be arrested at this point, with moderate fever, slight sub-icterus of the conjunctivae, traces of haemorrhage and always with marked nephrosis.

2. *The hepato-renal form.* In these more serious infections, which are the commonest, the liver also reacts, and nephrosis, jaundice and haemorrhages are observed. The icterus is not very pronounced, and is always followed by haemorrhages (nasal, labial or gingival, intestinal and gastric) preceded and accompanied by intense nephrosis. The pulse is nearly always slow in relation to the temperature, and a divergence of the two is always a bad sign.

3. *The hypertoxic form.* A malignant hepato-renal form in which death supervenes before icterus has become general. The symptoms are high temperature, extreme agitation, eyes much congested, delirium, sphygmothermic discordance, epigastric anxiety, oliguria or anuria, convulsions, enterorrhagia, and black vomit preceding death on the third or fourth day. Intense nephrosis is always found in these cases and if they have resisted one or two days they become malignant hepato-renal forms.

Treatment has been exclusively symptomatic.

Dr. DIALHO made post-mortem examinations of all patients that died in hospital and in all cases found the characteristic Rocha Lima lesions of the liver cells in a more or less intense form. The renal lesions, although generally serious and constantly present, were not very characteristic. Gastric and intestinal haemorrhages were frequent but not constant. A diffuse steatosis of the myocardium, especially on the right side, was almost always found. Hyperaemia of the olivae cerebelli, with striking red spots, was observed fairly frequently.

The disease was combatted by the isolation of all patients and extensive anti-mosquito measures, such as fumigation of the houses and destruction of the larvae. As a result of these activities the mosquito index rate was reduced to 2 per cent., so there is every prospect of the disease being eradicated from Rio. At Nilopolis, a small town not far from the capital, there were a few cases of yellow fever treated by convalescent serum, and also by a specific yellow fever vaccine prepared by Dr. ARAGÃO. This is a modification of the formalinized vaccine recommended by HINDLE [this *Bulletin*, Vol. 25, p. 539].

E. H.

DA CUNHA (A. Marques) & MUNIZ (Julio). [In Portuguese & English.] Notas sobre a febre amarella. **Notes about Yellow Fever.**—*Inst. Oswaldo Cruz, Supplemento das Memorias.* 1928. Oct. 15. No. 2. In Portuguese pp. 47–50. In English pp. 51–54. With 8 charts on 2 plates.

The authors carefully examined cases of yellow fever both during the attack, when the blood is known to be infective, and also in the later stages, in order to see whether leptospira ever occurred as a secondary infection. Various culture methods were employed and the results were uniformly negative. Details are given of the results of inoculating monkeys with the virus and the symptoms produced. The course of the disease varied, one individual having an incubation period of 10 days and another succumbing without showing any very marked rise in temperature. The necrosis of the liver cells was found to be absent in two monkeys which were proved to be infected with the disease, thus calling attention to the difficulty of recognizing some cases even after pathological examination.

E. H.

Leger (Marcel). Etat actuel de nos connaissances sur l'épidémiologie de la fièvre jaune. [**The Present State of our Knowledge of the Epidemiology of Yellow Fever.**]—*Gaz. hebd. Sci. Méd. de Bordeaux.* 1928. Nov. 11. Vol. 49. No. 46. pp. 731–733.

A brief and accurate summary of the present state of our knowledge, together with some interesting suggestions. As to the reason why yellow fever is absent from so many countries where the transmitting mosquito is abundant and other conditions seemingly favourable, the author aptly remarks that it is far too simple an explanation to assume that the mosquitoes have never had a chance of becoming infected by feeding on cases during the infective period.

E. H.

Kuczynski (Max H.) with Hohenadel (Bianca). Untersuchungen zur Ätiologie und Pathogenese des Gelbfiebers. [**Studies of the Aetiology and Pathogenesis of Yellow Fever.**]—*Klin. Woch.* 1929. Jan. 1 & 8. Vol. 8. Nos. 1 & 2. pp. 9–14; 58–63. With 11 text figs. [20 refs.]

The first part of this article deals with the methods employed in obtaining cultures of an organism, "*Bacillus hepatodystrophicans*," considered by the author to be the causative organism of yellow fever. The cultural methods, in the main, resemble those used for the culture of Rickettsia and Bartonella, described by the author in previous publications.

The most useful was a semi-solid physiological medium referred to as "MON," which has the following composition :—

160 cc. normal saline.
60 cc. ascitic fluid (unheated if possible).
40 cc. "PGN."
28 cc. Hottinger-agar or 21 "Ams"-agar.

"PGN" is a physiological cell-nourishing fluid of use for tissue culture, and consists of 1 per 1,000 peptone and 2·5 per 1,000 glycogen in Normosal (a physiological serum and salt mixture, supplied by the "Sächsichen Serumwerkes," Dresden).

In addition to "MON" another medium, "NN," previously used by the author for the cultivation of Rickettsia, was used in the present investigation. Its composition is as follows :—

100 cc distilled water.
10 cc. Hottinger or 21 "Ams" Broth.
1 gm. normosal
10 cc. 3 per cent. glycogen solution.
The whole mixed with one-third its volume of ascitic fluid.

The authors employed the Sellards and Hindle strain of yellow fever, which they had obtained from Paris. *Macacus rhesus* and *M. cynomolgus* were used for the maintainance of the strain, and as in the case of previous observers, the virus was found to be present in the blood and serum of infected animals as well as in the tissues.

In a preliminary discussion it is pointed out that yellow fever has an acute bacteraemic phase, during which the blood is infective, followed by a hepatodystrophic phase, the result of the injury to the liver, and resulting in jaundice and acute atrophy of the liver. The inoculation of blood is preferred to the use of infected tissue for carrying on the

strain ; one of the investigators became infected as the result of pounding up infected liver in a mortar, when tiny splashes of the material fell on his cheek. The other worker also became infected. Two strains were isolated from these patients and it is interesting to note that one of these, the " Hohenadel " strain, has proved to be much more virulent than the original one.

The pathological changes in infected monkeys are described with the object of showing that the disease can easily be diagnosed when other causes of the characteristic condition, such as certain intoxications, can be excluded.

The authors then proceed to describe the results of cultures put up from about 40 infected monkeys. Large numbers of these animals were found to have a latent infection with a very fine Vibrio or Spirillum, named *Vibrio macaci*, which readily grew in the culture media. This organism produced no obvious symptoms when inoculated into monkeys and also did not give immunity against yellow fever, so it would seem to be non-pathogenic.

" *Bacillus hepatodystrophicans*," the other organism, was only obtained direct from infected animals in cultures of blood and tissues in " MON." After a first culture had been obtained it could be transferred to a one-eighth concentration of Hottinger Agar mixed with 40 per cent. ascitic fluid, if it was introduced together with " NN." In this medium it simply grew as a sediment ; on " MON " the growth was at first superficial, but in later passages extended downwards to the bottom of the tube. The cultures give off a peculiar unpleasant odour resembling the breath of yellow fever patients.

The culture is at first Gram negative, but later gives variable results, especially in old cultures.

The shape of the organism is extremely variable ; minute coccoid forms together with fine bacilli assuming irregular club shapes are seen in the original cultures. In " NN," delicate, slightly curved bacilli, grow in little heaps. The size varies from 0·3 to 0·4 μ in diameter, in the coccoid forms, up to 1·1 μ long by 0·4 to 0·6 μ in the bacillary forms. The microscopic picture is said to resemble the cultures of Rocky Mountain spotted fever virus. It is noted that the presence of surviving tissue improves and strengthens the culture in artificial media, but is not essential. The virus is said not to persist in " MON " culture tubes for more than five days at 35° C., unless there is microscopical evidence of the growth of the bacillus.

The second part is concerned with the results of animal experiments, but the authors first discuss the possibility of invisible virus accompanying the visible cultures, and it it is pointed out that when obtaining successes up to the 15th generation of subcultures such an explanation is untenable. It is admitted, however, that as in Rickettsia, in the overwhelming majority of cultures set up, the virus dies out rapidly, though in a few cases it adapts itself slowly to the culture medium and thrives.

Particulars are given of inoculations into monkeys of a culture (312) which up to the 11th passage preserved a relative virulence. In the first passage, after keeping the culture 19 days in the incubator, a monkey was infected and 13 days after inoculation died with symptoms of yellow fever. With subsequent passages the infections produced were non-fatal and in some cases almost negligible in their symptoms, but immunized the monkeys against subsequent inoculations of infected blood, often in doses of 3 cc. The inoculation of carbolized

vaccine made from these cultures gave very uncertain results. Later, another strain has been isolated in culture which even after many passages is said to produce serious infections in monkeys and even in the form of a carbolized vaccine is able to protect monkeys.

Finally, a mixture of convalescent yellow fever serum with the culture virus when inoculated into monkeys, produced no reaction nor any illness.

The authors attempt to explain the extremely variable results of their culture experiments, and consider that the organism varies considerably in its properties and only with difficulty becomes adapted to the artificial media in which it is grown.

E. H.

Moncorvo (Filho). Diagnostico differencial da febre amarella na infancia. [**The Differential Diagnosis of Yellow Fever in Childhood.**]—*Brasil-Medico.* 1928. Nov. 3. Vol. 42. No. 44. pp. 1234–1239.

The symptoms of yellow fever may differ considerably in children from those seen in adults, partly, no doubt, because the former are unable to describe symptoms such as headache, backache, general pains; while general restlessness and rise of temperature are common to many infections in an early stage. Slight rise of temperature to 38° C. or so and early vomiting may be the only signs noticed.

The most important of the diseases which have to be distinguished from yellow fever and are discussed in this paper are: (1) *Influenza*, particularly in its severe forms. Though haemorrhages are uncommon, they were nevertheless seen in many of the more serious cases of the pandemic of 1918. Albuminuria at an early stage and black vomit, if present later, are important points of distinction, and jaundice is not common in influenza, but is present usually, even though it may be very slight, in yellow fever. (2) *Malaria*, particularly bilious remittent, may be distinguishable only by blood examination; the two may possibly coexist. (3) *Digestive disturbances* in children may show vomiting, icterus and fever, but not albuminuria nor haemorrhages. (4) *Plague.* Ferrari in 1902 related the case of a child of 13 years who, he believed, was suffering from bubonic plague, but on the sixth day black vomit appeared. (5) *Weil's disease* will probably not be differentiated except by laboratory examination—the presence of leptospira in urine and the spinal fluid, animal inoculation, etc.

Among other conditions mentioned as possibly causing difficulty are recurrent fever, phosphorus poisoning, angiocholitis [surely rare in young children] and diphtheria.

H. Harold Scott.

Jakob, Fialho (A.), Villela (A.) & E. L. Alterações do systema nervoso na febre amarella. (Nota prévia). [**Changes in the Nervous System in Yellow Fever. (Preliminary Note).**]—*Brasil-Medico.* 1928. Aug. 18. Vol. 42. No. 33. p. 923.

The authors have examined the central nervous system in 15 cases in the 1928 epidemic of yellow fever. They report a steatosis more or less intense in the cells of the cerebral cortex and in the subcortical zones, in particular the corpus striatum and corpus dentatum. In addition they noted much fat in the neuroglia and adventitial cells of the vascular walls. Adjacent to the capillaries there were focal changes

with dissociation of tissue and slight glial proliferation; more rarely small lymphocytic infiltrations nodularly disposed about the capillaries. Researches are being continued.

H. Harold Scott.

Lacorte (José Guilherme) & Villela (Gilberto Cuimãraes). [In Portuguese & French.] O liquido cephalo-racheano na febre amarella. Le liquide cephalo-rachidien dans la fièvre jaune. [**The Cerebrospinal Fluid in Yellow Fever.**]—*Inst. Oswaldo Cruz, Supplemento das Memorias.* 1928. Oct. 15. No. 2. In Portuguese pp. 62–63. In French pp. 63–64.

—— & ——. Le liquide céphalorachidien dans la fièvre jaune.—*C.R. Soc. Biol.* 1928. Nov. 30. Vol. 99. No. 34. pp. 1663–1664. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

The authors examined the cerebrospinal fluid of ten cases of yellow fever during the recent epidemic in Rio. Apart from its high tension and increase in the albumen and chlorides no constant changes are recorded. The liquid from two patients with fever of less than 72 hours duration and from one patient after this period was inoculated into three monkeys with negative results.

E. H.

Chagas (E.). Syndrome surrénal dans la fièvre jaune. [**The Supra-Renal Syndrome in Yellow Fever.**]—*C.R. Soc. Biol.* 1928. Nov. 30. Vol. 99. No. 34. pp. 1664–1665. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

The author observed a supra-renal syndrome in 10 to 15 per cent. of the yellow fever cases during the recent epidemic in Rio. The symptoms were generally observed in non-fatal cases and take about ten days to develop. The most marked features of these cases were a profound adynamic condition persisting during the convalescence, associated with very pronounced dilatation of the peripheral vessels. There was also a fall in the arterial pressure from 100-70 mm. to 50-30 mm. on the 2nd or 3rd day, which continued throughout the attack. Brachycardia, sometimes very pronounced, up to 32 per minute, is always present. Haemorrhages are not very extensive and considerable loss of blood has never been observed. Jaundice is somewhat inconstant and almost always appears during convalescence. Death is generally the result of cardiac insufficiency. The appearance of patients is generally very striking because of the adynamic condition and depression, but the evolution of the disease is said to be almost always benign.

E. H.

Torres (C. Magarinos) & de Azevedo (A. Penna). Lésions des surrénales dans la fièvre jaune. [**Lesions of the Supra-Renals in Yellow Fever.**]—*C.R. Soc. Biol.* 1928. Nov. 30. Vol. 99. No. 34. pp. 1673–1674. With 1 text fig. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

The occurrence of symptoms indicating affection of the supra-renals in the recent yellow fever epidemic at Rio de Janeiro [see above] suggested histological examination. The supra-renals of nine patients, dead of yellow fever, were examined and necrosis of the cortex found to

be constantly present, eosinophile cells with pycnotic nuclei being very evident. The cytoplasm of the glomerular zone and fasciculi contained a homogeneous acidophile substance, forming rounded masses surrounded by a clear halo. These masses stain a deep rose colour with eosin, and examined with a polarimeter are birefringent.

Similar acidophile bodies have been observed in a case of lobar pneumonia and of tuberculosis, but are especially abundant in yellow fever cases.

E. H.

Penido (J. C. N.). [In Portuguese & English.] Observações sobre alguns elementos da urina na febre amarella. **Observations on Some Elements of Urine in Yellow Fever.**—*Inst. Oswaldo Cruz, Supplemento das Memorias.* 1928. Oct. 15. No. 2. In Portuguese pp. 65–68. In English pp. 69–72. With 5 graphs.

The urine of 20 patients in the recent Brazilian outbreak has been examined in detail. It was found possible to estimate the severity of a case by successive examinations of the urine. In mild cases, there was a high concentration of urea in the daily elimination, whilst in fatal cases the opposite occurred. The elimination of chlorides is always very small and is inversely proportional to the urea. At convalescence there is an increase in chlorides and a decrease in urea. Uric acid and puric bases seem to be eliminated in a similar way to urea. Albuminuria and cylindruria generally appeared on the third day. Glycosuria was never observed. In the sediment large cylindrical cells were found, probably as a result of degeneration of the tubules of the kidney. The elimination of urine was found to be effected in the same way as in nephrosis.

E. H.

Jungmann (Paul). Zur Klinik des Gelbfiebers. Ein Beitrag zur Pathologie der Leber. [**Clinical Records of Yellow Fever. A Study of the Liver Pathology.**]—*Klin. Woch.* 1929. Jan. 1. Vol. 8. No. 1. pp. 14–17. With 5 charts in text.

A detailed study of two cases of laboratory infection [see above, p. 297]. In both the patients seem to have acquired the disease by the splashing of infected material from monkeys in the course of grinding up tissues for inoculation.

Both patients showed fairly typical symptoms , with the development of jaundice and albuminuria. The various features of the disease are discussed in great detail, with special reference to the general clinical pathology of the liver and kidney.

E. H.

Fialho (Amadeu), Bicalho (Nair) & Pacheco (Graziella). Doseamento dos lipideos no figado humano no curso da febre amarella. [**Amount of Fatty Substances in the Liver in Yellow Fever.**]—*Brasil-Medico.* 1928. Dec. 8. Vol. 42. No. 49. pp. 1369–1370.

The recent epidemic afforded an opportunity for chemical investigations of the tissues of fatal cases. This is a preliminary note dealing with a few cases and with the liver only. The method employed was

titration of 2 gm. of dried liver with a little washed and dried sand, and the addition of anhydrous sodium sulphate. The fat was extracted by a Soxhlet apparatus in the usual way. The results varied within wide limits, the lowest being 16, the highest 71 gm. per cent. Fuller accounts and the results of examination of other organs will be published later.

H. Harold Scott.

TORRES (C. Magarinos). Sobre a "necrose salpicada" do figado na febre amarella. [**Necrobiosis of the Liver Cells in Yellow Fever.**] —*Sciencia Med.* 1928. Aug. Vol. 6. No. 8. pp. 402–404. With 1 text fig. English summary pp. 404–405.

The author has examined the liver of 12 cases of yellow fever in the recent outbreak in Rio de Janeiro, and in each found the scattered necrosis of the liver cells in the lobules, which is such a characteristic feature of the disease, and of great importance in *post-mortem* diagnosis.

Occasionally, in frozen sections, recently fixed in neutral formalin and stained with dilute haematoxylin, liver cells were observed in early stages of necrobiosis with oval shaped nuclei, 7·5 μ in diameter, well preserved but much less rich in chromatin than normal liver cell nuclei which are also much larger, 11·9 μ in diameter. Some of these cells with small nuclei contain large numbers of fat globules. The necrotic cells represent a further stage in the process of necrobiosis and are somewhat different from the necrotic liver cells in chronic passive congestion, being smaller and showing a longer preservation of the staining properties of the nucleus.

In yellow fever, the necrobiosis of the liver cells is said to be a peculiar slow one, as compared with that associated with chronic passive congestion and common infectious diseases.

E. H.

TORRES (C. Magarinos). Sobre a degeneração oxychromatica da cellula hepatica como lesão caracteristica na infecção experimental pelo virus brasileiro da febre amarella. [**The Oxychromatic Degeneration of the Liver Cells as a Characteristic Lesion in Experimental Infections of the Brazilian Strain of Yellow Fever.**]—*Brasil-Medico.* 1928. Sept. 8. Vol. 42. No. 36. p. 1001. English summary pp. 1001–1002. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

The changes in the livers of *Macacus rhesus* and *M. cynomolgus* inoculated with the recently isolated virus of yellow fever from cases in Rio de Janeiro, were found to be somewhat variable, especially in respect of the acute necrosis and necrobiosis of the liver cells. One liver was found to show none of these changes and yet contained the virus, as shown by subsequent inoculation. The only constant change observed was oxychromatic degeneration of the liver cells, with the development of acidophile intranuclear inclusions. These changes were not found in monkeys dying of tuberculosis, or causes other than yellow fever.

The author's results lead him to the belief that yellow fever is caused by a filterable virus which produces typical inclusions only within the nucleus, as in the case of herpes zoster, symptomatic herpes, varicella and virus III infection of rabbits. E. H.

TORRES (C. Magarinos). Sur l'importance de la dégénérescence oxychromatique des cellules du foie chez *Macacus rhesus* inoculé avec le virus brésilien de la fièvre jaune. [**On the Importance of Oxychromatic Degeneration of the Liver Cells of** *M. rhesus* **inoculated with a Brazilian Strain of Yellow Fever.**]—*C.R. Soc. Biol.* 1928. Nov. 30. Vol. 99. No. 34. pp. 1671–1672. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

A strain of yellow fever isolated by DA CUNHA and MUNIZ [see above, p. 295], was found in some cases not to produce the typical necrosis of the liver cells. The first monkey inoculated showed necrosis, but the second animal failed to show this feature, although a third one inoculated from the second, again developed typical necrosis of the liver cells.

A comparison of the lesions produced in monkeys by the African and Brazilian strains, respectively, suggests that necrosis of the liver cells is not such a constant phenomenon in the case of the Brazilian strain as of the African one. On the other hand the oxychromatic degeneration described above, was constantly present in animals infected with the Brazilian strain, and is regarded as a more typical feature than fatty degeneration or necrosis.

[A second monkey infected by DA CUNHA and MUNIZ (see below, p. 303), failed to show even this oxychromatic degeneration, so at present there seems to be no certain histo-pathological method of diagnosis.]

E. H.

TORRES (C. Magarinos). Inclusions nucléaires acidophiles (dégénérescence oxychromatique) dans le foie de *Macacus rhesus* inoculé avec le virus brésilien de la fièvre jaune.—*C.R. Soc. Biol.* 1928. Nov. 2. Vol. 99. No. 30. pp. 1344–1345. With 1 text fig. [1 ref.] [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

——. Inclusions intranucléaires et nécrobiose chez *Macacus rhesus* inoculé avec le virus de la fièvre jaune.—*Ibid.* Nov. 30. Vol. 99. No. 34. pp. 1655–1656. With 1 text fig. [1 ref.] [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

——. Dégénérescence oxychromatique dans le foie de *Macacus rhesus* et *M. cynomolgus*, accompagnant les lésions typiques de la fièvre jaune expérimentale ; son absence dans le foie de singes non inoculés.—*Ibid.* pp. 1660–1663. With 2 text figs. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil]

——. Sur la dégénérescence oxychromatique du foie chez les singes inoculés avec le virus de la fièvre jaune. [**The Oxychromatic Degeneration of the Liver in Monkeys inoculated with Yellow Fever Virus.**]—*Ibid.* pp. 1669–1671. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil]

——. Inclusões nucleares acidophilas (degeneração oxychromatica) na febre amarella experimental.—*Sciencia Med.* 1928. Sept. Vol. 6. No. 9. pp. 427–429. With 1 plate. English summary pp. 429–430.

All these notes are needless repetitions of the views expressed in the preceding abstracts.

E. H.

Bauer (Johannes H.) & Hudson (N. Paul). **Passage of the Virus of Yellow Fever through the Skin.**—*Amer. Jl. Trop. Med.* 1928. Sept. Vol. 8. No. 5. pp. 371–378. [1 ref.]

Three monkeys were infected by placing infected blood on intact, shaved, and scarified skin respectively. A second similar experiment, but omitting scarification, gave negative results probably owing to the blood not containing a sufficiently high concentration of virus, for when repeated with another sample of infected blood infection followed. One monkey received a drop of infected blood in the conjunctival sac, and another 0·5 cc. in the mouth but both remained uninfected.

When an emulsion of infected mosquitoes was placed on the skin it produced infection only when the skin had been previously scarified.

The results of these experiments indicate the extreme care necessary in working with yellow fever, for although the human skin is probably more resistant than that of the abdomen of a monkey, in practice the hands are continually subject to small abrasions, often unknown, which might serve as portals of entry for this very active virus. E. H.

da Cunha (A. Marques) & Muniz (Julio). Transmission de la fièvre jaune au *Macacus rhesus*. [**The Transmission of Yellow Fever to *Macacus rhesus*.**]—*C.R. Soc. Biol.* 1928. Nov. 30. Vol. 99. No. 34. pp. 1665–1669. With 4 text figs.

A monkey inoculated with blood collected on the second day of fever from a benign case of yellow fever in Rio, was killed on the 12th day, and showed typical symptoms of the disease, necrosis of the liver, fatty degeneration, etc. A second monkey inoculated from this first one, was killed on the 8th day, when its temperature was subnormal, and showed typical symptoms of the disease, but no trace of necrosis, fatty degeneration or polymorphonuclear infiltration could be found. Yet a monkey subinoculated from this one again showed typical symptoms. Eight passages have been made and it is noted that in estimating whether a monkey shows fever or not it is necessary to take into consideration the normal temperature of each individual, which shows considerable variation. In one instance a monkey inoculated with infected blood of *M. cynomolgus* taken at the autopsy, died of yellow fever 14 days later, whilst another, inoculated with blood collected at the height of fever, died on the 6th day. Another monkey inoculated with yellow fever, and proved by subinoculations to contain the virus, was killed before it had shown the final drop in temperature and the histo-pathological examination showed a complete absence of all the characteristic features of the disease, including the oxychromatic degeneration of the liver. It is evident, therefore, that there may be considerable difficulty in recognizing the tissues of monkeys infected with the Brazilian strain of yellow fever. E. H.

Aragao (Henrique de Beaurepaire). [In Portuguese & English.] Relatorio a respeito de algumas pesquizas sobre a febre amarella. **Report upon some Researches on Yellow Fever.**—*Inst. Oswaldo Cruz, Supplemento das Memorias.* 1928. Oct. 15. No. 2. In Portuguese pp. 23–34. In English pp. 35–46. With 9 figs. on 7 plates. Also in *Bruxelles-Méd.* 1928. Nov. 25. Vol. 9. No. 4. pp. 95–105. [1 ref.]

The first part of the paper is in continuation of that reviewed below [p. 305]. The blood of 21 yellow fever patients was used for in-

fection experiments and inoculated into 26 *M. rhesus* and 1 *M. cynomolgus*. Five of these patients had been ill for more than 72 hours, and in every case their blood was negative and produced no symptoms when inoculated into monkeys. With the remaining 16 patients similar experiments gave varying results. In 4 monkeys a fatal infection was produced ; in other cases the inoculation of blood was followed by more or less typical febrile symptoms, which immunized the animal against subsequent inoculations of the virus. On the other hand some of the inoculated monkeys succumbed to yellow fever when another dose of virus was injected. In one case, the blood of a patient (who succumbed to the disease) injected into monkeys on two successive days caused death with the sample taken 36 hours after fever had begun, but the one extracted after only 10 hours produced only atypical febrile oscillation. This monkey, however, was immune against subsequent inoculations of virus. Of the 4 fatal infections in monkeys, 3 came from mild cases and one from a severe fatal case. Infected blood kept in the ice chest was found to retain its virulence for 9 days, but had lost it after 14 days. The virus seems to be much less pathogenic to monkeys than either the "Asibi" or the Sellards and Hindle strain. The author remarks that it is only rarely fatal and that 0·2 cc. of blood is the minimum lethal dose as compared with 0·0001 cc. for the African strain [HINDLE, this *Bulletin*, Vol. 25, p. 539]. Mosquitoes fed on patients respectively 10 and 36 hours after the beginning of the attack were shown to be infective. The course of the disease in monkeys and the pathological symptoms resemble those previously described.

Tissues from seven patients who died of yellow fever, on the 4th and 5th days of illness, were inoculated into 9 monkeys, none of which became infected, thus confirming the view that after the third day the virus disappears from the human organism. The identity of the African and American strains of yellow fever virus was proved by a cross immunity experiment. Pieces of liver [infected with the African strain] preserved on ice, were taken by Dr. CHAGAS to Rio and inoculated into two *rhesus* monkeys. Only one showed a slight febrile reaction, but both were immunized against subsequent inoculations of the Brazilian strain of yellow fever.

The protective properties of convalescent serum have been used by the author to confirm the diagnosis in doubtful cases of yellow fever. 2 cc. of the patient's serum is inoculated into a monkey, followed by a lethal dose of virus the following day. If the serum protects the monkey against infection it is a sign that the patient had suffered from yellow fever.

Vaccination against yellow fever. The author prepared the glycerine and phenol vaccine recommended by HINDLE, and also another in which the glycerine was left out and replaced by 2 in 1,000 formaldehyde. Both vaccines were found to protect monkeys against the disease, but the latter was preferred for use in man as the absence of glycerine made it less painful. The vaccine is prepared as follows :—

An infected monkey is killed shortly before death, and the liver, kidneys, spleen and brain removed and carefully examined for any signs of secondary infection. If sound they are washed in sterile saline solution, wiped on filter paper and weighed. They are then cut up into small pieces and triturated in a mortar with sand. Each part of tissue is diluted with 5 parts sterile distilled water, containing 0·5 per cent. phenol and 2 per 1000 formaldehyde, and the mixture well shaken until homogeneous. The resulting liquid is filtered through four layers of gauze and the filtrate

kept in the ice box for 5 days when it is tested for sterility by inoculation into guineapigs, and by culture methods. If sterile, the vaccine is distributed into 2 cc. ampoules and is ready for use. The dose in man is 2 cc., given subcutaneously, and care should be taken to shake the ampoule before use, as a deposit forms.

The vaccine was first used for the protection of the staff of the Oswaldo Cruz Institute who were working with yellow fever, and since it was found to produce no ill effects was then used by the Public Health Department, in isolated foci of the disease. More than 300 persons have already been vaccinated, and in every case the inoculation has produced no troublesome reactions. Moreover, none of these vaccinated persons has become infected although presumably some were exposed to infection. The Public Health Department are making more extensive experiments with the vaccine and 2,000 more doses are ready for use. [The results of these interesting experiments support the hope of anti-yellow fever vaccine furnishing an effective prophylactic measure against this disease.*] E. H.

Aragão (Henrique de Beaurepaire). Recherches sur la fièvre jaune. [**Researches on Yellow Fever.**]—*C.R. Soc. Biol.* 1928. Nov. 2. Vol. 99. No. 30. pp. 1341–1343. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

The author has successfully inoculated the strain of yellow fever occurring at Rio de Janeiro into three species of monkeys, viz., *Macacus*

* The following extract suggests that some caution must be exercised in drawing deductions from such experiments.

" Practical application of the preventive vaccination with the killed cultures of *Leptospira icteroides* was first undertaken by Dr. Pareja and the writer in Quito in non-immune soldiers who, after a second vaccination, were sent down to Guayaquil, where yellow fever was still prevalent (1918). Other soldiers and numbers of civilians were subsequently vaccinated (1919). Among the vaccinated the case-incidence was about 11 per 1000, while among the non-vaccinated it was about 110 per 1000. The concentration of the vaccine was afterwards increased many hundredfold, and trial was continued under the direction of Dr. Theodore C. Lyster, of the International Health Board of the Rockefeller Foundation. Lyster, Vaughn, Bailey, and the departments of public health of Mexico, Salvador, Guatemala, British Honduras, and adjacent countries vaccinated during the years 1920 and 1921 about 10,000 non-immune individuals residing in the infected areas of these countries. The reports show that none of the individuals who received two injections of 2 c.cm. of the vaccine contracted yellow fever, while a few of those who received a single injection became infected later. Comparison of these figures with the number of cases which developed among the non-vaccinated population during the same periods and in corresponding localities was so striking that the protective value of the vaccine seems conclusively proven. It has also been brought out that the vaccinated individuals are perhaps as susceptible as the unvaccinated during the first 10 or 15 days following the last injection. The protection becomes effective only after the lapse of that period, which undoubtedly is that required for the development of immunity in the body of the vaccinated individual.

" In 1921 Peru suffered from the visitation of a tremendous yellow fever epidemic, in which 15,000 cases of the disease were reported. . . . Dr. Joseph H. White, assistant surgeon-general of the U.S. Public Health Service, who witnessed the Peruvian campaign, reports that in one instance 50 non-immune soldiers, 25 of whom had been vaccinated, were stationed in the villages where the epidemic of yellow fever was at its height. Of the 25 non-vaccinated soldiers, 20 contracted the disease, while none of the 25 vaccinated came down."

Noguchi (Hideyo). Researches on Yellow Fever. Comparative Aetiological, Pathological, and Epidemiological Considerations ; Prevention and Treatment.—*Lancet.* 1922. June 17. pp. 1185–1191.

rhesus, *M. cynomolgus* and *M. speciosus*. The first two species were readily infected by the inoculation of blood from yellow fever patients, and *M. speciosus* by the inoculation of liver emulsion from a *rhesus* monkey dead from the disease; the course of the resulting infection and also the post-mortem appearances agree with those previously described [see HUDSON, this *Bulletin*, Vol. 25, p. 853]. The infection was not always fatal to the monkeys, and the author notes the curious feature that mild cases of yellow fever seem to be the most favourable for producing the infection in monkeys. Two monkeys inoculated with blood from such cases both succumbed to the infection, whilst three others inoculated with blood taken from a severe case which died before the third day, did not become infected. [This may explain some of the earlier failures to transmit yellow fever to monkeys.]

Fifteen cases of yellow fever in man, and all the infected monkeys, were carefully examined for the presence of Leptospira and none found; also serological tests, employing the Palmeiras strain of *L. icteroides* and *L. icterohaemorrhagiae* gave negative results. Complement fixation tests, using carbolized liver of infected monkeys as antigen, gave negative results; the Wassermann test was also negative. [The author's results indicate that the South American strain of yellow fever does not differ from the West African one, as in both cases inoculation into susceptible monkeys produces identical symptoms.]

E. H.

THEILER (Max) & SELLARDS (Andrew Watson). **The Immunological Relationship of Yellow Fever as it occurs in West Africa and in South America.**—*Ann. Trop. Med. & Parasit.* 1928. Dec. 28. Vol. 22. No. 4. pp. 449–460. [11 refs.] [Harvard Med. School, Boston, Mass.]

An experimental study proving the identity of the African and Brazilian strains of yellow fever. The authors used a West African strain of virus and serum collected from patients at Parahyba, Brazil, about 3½ months after an attack. These sera had been stored since 1926 at 2° to 4° C. and had previously been tested against *Leptospira icteroides* [see this *Bulletin*, Vol. 25, p. 543.]

Two sets of experiments were made. In the first series the virus was inoculated subcutaneously and the convalescent serum intraperitoneally; in the second, they were mixed *in vitro* and inoculated subcutaneously. As a rule 2 cc. of serum was used and controlled by testing sera from other diseases. The authors state that monkeys frequently die of yellow fever without showing any distinct rise in temperature; consequently this is not a certain method of detecting mild infections. In a preliminary experiment three control sera and one immune serum from Brazil were tested against the African virus. All three monkeys inoculated with control sera and virus died of yellow fever, whilst the other remained healthy. Nine specimens of convalescent serum were then tested against virus, of low virulence as a result of being kept in the freezing room for some time. Of the nine animals receiving convalescent serum and virus, two died and seven remained well. One monkey died on the 22nd day and the histological examination confirmed the diagnosis of yellow fever. The other died on the 26th day with doubtful symptoms. Of three controls, two died and one recovered after an attack of yellow fever. Seven of

the sera were retested in monkeys using fully virulent material. Four of these animals survived and three died on the seventh day. Two controls both died on the fourth day. Active immunity was found to be present one month after the injection of convalescent serum and virus of low virulence. One specimen of serum when injected without virus, conferred passive immunity for one month ; this same serum mixed with virus, protected the animal, but the passive immunity had disappeared at the end of one month. Three animals that survived the protection test of convalescent serum and virus of high virulence, were found to be actively immune two and a half months later, whilst a fourth animal only injected with convalescent serum had lost its passive immunity and died of yellow fever six days after being inoculated. The authors' results show that passive immunization against yellow fever in monkeys with human convalescent serum, lasts for about one month. [The results of this valuable study should put an end to any further suggestions that yellow fever in West Africa is a different disease from that occurring in America.]

E. H.

Pettit (Auguste), Stefanopoulo (Georges) & Frasey (Victor). Pouvoirs préventif et curatif du sérum anti-amaryllique. [**The Protective and Curative Properties of Anti-Yellow Fever Serum.**]—*C.R. Soc. Biol.* 1928. Oct. 19. Vol. 99. No. 28. pp. 1114–1116. [1 ref.]

This paper is a continuation of a preceding one [this *Bulletin*, Vol. 25, p. 851], and gives the results of treating ten monkeys with anti-yellow fever serum; five were inoculated with the serum of a baboon, and five with horse serum. In two experiments the serum was injected the day previous to a dose of virus ; in the others the serum was administered respectively, the same day as the virus, the following day, two days later, and three days later, the injections of serum being repeated for three or four days. None of these animals became infected and all resisted a second inoculation of virus made 14 days after the first one. Two monkeys were inoculated with the virus as controls, and one died of yellow fever, whilst the other recovered after a severe attack.

E. H.

Kaneko (Renjiro). Ein pathologisch-anatomischer Beitrag zur Frage der Identität der *Leptospira icteroides* und der *Spirochaeta icterohaemorrhagiae*. [**A Pathological-Anatomical Study of the Question of the Identity of** *Leptospira icteroides* **and** *Sp. icterohaemorrhagiae*.]—*Klin. Woch.* 1928. June 24. Vol. 7. No. 26. p. 1236. [6 refs.] [First Med. Clinic, Imperial Kyushu Univ., Fukuoka.]

The author examined sections of guineapigs, supplied by Noguchi, which were supposed to be infected with yellow fever and showed the characteristic necrosis and fatty degeneration of the liver cells, not found in cases of Weil's disease. To explain these results he supposes that Noguchi infected his guineapigs with a mixed infection of Leptospira and yellow fever.

[All subsequent observers have failed to infect guineapigs with either African or American strains of yellow fever.]

E. H.

Hoffmann (W. H.) & Jahnel (F.). Nachforschungen nach der Gelbfieberspirochäte Noguchis in Organen von an afrikanischem Gelbfieber verstorbenen Menschen. [**A Search for Noguchi's Yellow Fever Spirochaete in the Organs of African Yellow Fever Cases.**]—*Muench. Med. Woch.* 1928. Dec. 14. Vol. 75. No. 50. pp. 2131–2132. [Finlay Inst., Havana, Cuba & " Kaiser Wilhelm " Inst., Munich.]

An examination of the organs of yellow fever patients from West Africa for Leptospira gave entirely negative results.

E. H.

da Cunha (A. Marques) & Muniz (Julio). La fièvre jaune et *Leptospira icteroides*. [**Yellow Fever and** *Leptospira icteroides*.]—*C.R. Soc. Biol.* 1928. Nov. 30. Vol. 99. No. 34. pp. 1656–1657. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

Employing Noguchi's technique, the authors examined the blood of 13 yellow fever patients at Rio de Janeiro, taken at different stages in the disease. In every instance, cultures, inoculation into guineapigs and dark ground examination of blood and infected tissues, gave uniformly negative results as regards Leptospira.

E. H.

Pettit (Auguste) & Stefanopoulo (Georges). Le virus de la fièvre jaune. [**The Virus of Yellow Fever.**]—*Bull. Acad. Méd.* 1928. Oct. 2. Year 92. 3rd Ser. Vol. 100. No. 32. pp. 921–930. [40 refs.]

The first part of this article contains a summary of the evidence proving that yellow fever is not a spirochaetal disease, but is caused by a filtrable virus. The second part is an account of recent work with the virus.

E. H.

Chagas (Carlos). Sur la récente irruption de la fièvre jaune à Rio de Janeiro. [**The Recent Outbreak of Yellow Fever at Rio de Janeiro.**]—*Bull. Office Internat. d'Hyg. Publique.* 1928. Oct. Vol. 20. No. 10. pp. 1577–1583. With 2 graphs.

A useful account of the yellow fever epidemic in Rio de Janeiro during 1928, and the measures adopted in combating the disease.

E. H.

Bunau-Varilla (P.). La verdunisation dans la lutte contre la fièvre jaune. [**Water Chlorination in the Fight against Yellow Fever.**]—*C.R. Acad. Sci.* 1928. Nov. 26. Vol. 187. No. 22. pp. 1005–1006.

A suggestion that the chlorination of tap water, by killing vegetable growth and so making the water unfavourable for the breeding of mosquitoes, will help in the suppression of yellow fever.

E. H.

Aragão (Henrique Beaurepaire). Recherches sur la fièvre jaune. [**Researches on Yellow Fever.**]—*Bull. Office Internat. d'Hyg. Publique.* 1928. Oct. Vol. 20. No. 10. pp. 1584–1589.

A summary of the author's work, previously published elsewhere [see above].

E. H.

Barroso (Sebastião). A febre amarella no oeste africano.—*Brasil-Medico.* 1928. Sept. 15. Vol. 42. No. 37. pp. 1045–1047.

Barroso (Sebastião). Febre amarella. Pontos controversos.—*Brasil-Medico.* 1928. Nov. 3. Vol. 42. No. 44. pp. 1227–1229.

Barroso (Sebastião). Febre amarella. Pontos controversos. II.—*Brasil-Medico.* 1928. Nov. 10. Vol. 42. No. 45. pp. 1272–1274.

Carbonell (Manuel V.). El problema de la fiebre amarilla.—*Semana Méd.* 1928. Sept. 13. Vol. 35. No. 37 (1809). pp. 705–708.

da Fonseca (Olympio). Febre amarella e mosquito.—*Sciencia Med.* 1928. Nov. Vol. 6. No. 11. pp. 537–542. [1 ref.]

Fraga (Clementino). O surto de febre amarella no Rio de Janeiro.—*Rev. Med.-Cirurg. do Brasil.* 1928. Aug. Vol. 36. No. 8. pp. 344–349.

Hoffmann (W. H.). The Diagnosis of Endemic Yellow Fever.—*Amer. Jl. Trop. Med.* 1928. Nov. Vol. 8. No. 6. pp. 563–568. With 1 fig. [Finlay Inst., Havana, Cuba.]

Hoffmann (W. H.). La fièvre jaune africaine.—*Bull. Méd. du Katanga.* 1928. Vol. 5. No. 1/2. pp. 7–15.

Leger (Marcel). Etat actuel de nos connaissances sur l'épidémiologie de la fièvre jaune.—*Jl. Méd. de Bordeaux.* 1928. Dec. 10. Vol. 105. No. 24. pp. 970–982.

Mello (A. da Silva). O problema da immunidade na febre amarella.—*Brasil-Medico.* 1928. Sept. 29. Vol. 42. No. 39. pp. 1079–1087.

Mello (A. da Silva). Questões de epidemiologia no actual surto do febre amarella.—*Brasil-Medico.* 1928. Oct. 13. Vol. 42. No. 41. pp. 1137–1142.

Mello (A. da Silva). Febre amarella. Pontos controversos.—*Brasil-Medico.* 1928. Dec. 1. Vol. 42. No. 48. pp. 1339–1344.

Pittaluga (G.). El problema de la fiebre amarilla.—*Medicina Países Cálidos.* Madrid. 1928. Jan. Vol. 1. No. 1. pp. 5–25. With 2 text figs. [42 refs.]

de Rezende (Cassio). Febre amarella—Pontos controversos.—*Brasil-Medico.* 1928. Dec. 15. Vol. 42. No. 50. pp. 1395–1397.

Santos (Juvenal). Notas em torno de alguns casos de febre amarella.—*Brasil-Medico.* 1928. Oct. 20. Vol. 42. No. 42. pp. 1187–1190.

KALA AZAR.

SHORTT (H. E.), CRAIGHEAD (A. C.) & SWAMINATH (C. S.). **A Brief Résumé of Recent Kala-Azar Research with Special Reference to India.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 220–237. With 1 map & 1 plate. [51 refs.]

The authors review the present position of kala azar in India and summarize the investigations which have been conducted during the past few years with a view to discovery of the method of transmission and the most efficient method of treating the disease. The distribution is shown on a map which indicates two large endemic areas, the one comprising practically the whole of Bihar, Assam, Bengal and Orissa, and the other the eastern portion of the Madras Presidency south of a point a little north of Madras City. Probable present extensions of the endemic areas are also shown. These indicate involvement of the whole of the east coast of India, and the southern portion of Orissa, areas on the west coast with Trichur, Calicut, Mangalore and Bombay as centres and another area in the Punjab around Sunawar. There appears also to be a further extension of the Bihar focus in a westerly direction beyond Lucknow and Allahabad, and of that of Bengal to the southern coastal district. It is noted that in India kala azar is essentially a cyclical disease, a series of about ten years epidemic prevalence being succeeded usually by a longer interval of fifteen to twenty years of comparative quiescence, during which the epidemic becomes an endemic focus in which scattered cases occur in insufficient numbers to affect the vital statistics. Another point is that when the disease reaches an area previously unaffected, it seems to assume a specially virulent form. A third factor is that when an epidemic commences in a hitherto unaffected area or when the disease assumes epidemic form in an old endemic area, it does not do so at one particular spot, but in more than one, the different spots often being far distant from one another. This phenomenon implies some far-reaching factor in the causation of epidemics. So far as is known though the disease has been present in Madras for a long time, it has not appeared in epidemic form as in Assam. This may be due to the fact that in Assam the prevalence of Phlebotomus shows very great seasonal variations, whereas in Madras this is much less marked.

As regards the investigations which have been carried out, dermal leishmanoid is mentioned. It is noted that CHRISTOPHERS in his report on kala azar published in 1904 under the headings of mottling of the skin and papular eruption described this condition. Work on the parasite of kala azar and the method of its transmission has centred round *Phlebotomus argentipes* and the development which takes place in this insect. It is again noted that feeding experiments have failed to effect transmission. On white mice 3,590 flies, on Chinese hamsters 2,325 flies, and on human volunteers 1,247 flies at the supposedly infective stage have been fed without producing infection. Under the heading of treatment, special emphasis is laid on this as a public health measure. The authors believe that, taking into consideration the prevalence of the disease in Assam during 1917 to 1927, were it not for the wide-spread sterilization of the peripheral blood due to treatment, the outbreak would have been more disastrous than that of 1891

to 1901. The numbers of cases treated during 1924, 1925 and 1926 were 48,770, 60,940 and 46,231, figures which mean that in 1925 there would have been 60,940 more sources of infection than there actually were. Present indications show that in another year or two the disease in Assam will have regained the character prevalent in the inter-epidemic period when it exerts no influence on the mortality and health returns. There is a danger that then interest in the disease will wane, but it cannot be too strongly impressed on the governments concerned that this will be the time to prosecute with greatest vigour the eradication of all sources of future danger.

C. M. Wenyon.

HINDLE (Edward). **Further Observations on Chinese Kala Azar.**—*Proc. Roy. Soc.* 1928. Nov. 1. Ser. B. Vol. 103. No. B 727. pp. 599–619. With 4 figs. on 2 plates. [5 refs.]

The experiments described in this paper are a continuation of those previously recorded (this *Bulletin*, Vol. 24, p. 639). The statement previously made regarding the possiblity of infecting the sandflies *P. major* var. *chinensis* and *P. sergenti* is confirmed. Both became infected after feeding on human beings suffering from kala azar or on experimentally infected hamsters, but whereas in the latter the flagellates were limited to the stomach and disappeared with the completion of digestion of the blood meal, in the former the stomach phase persisted while flagellates in a certain proportion of sandflies passed forwards through the oesophagus, multiplied in the pharynx and extended along the proboscis. The results of feeding sandflies on four patients are described. Two of these led to infection of a certain number of flies and two did not. In previous work and that recorded in this paper, a total of 14 patients were used for infecting sandflies, but only 4 of these proved infective to the insects. Of the flies actually fed on these four cases only 5 per cent. showed any development of flagellates. It is concluded that the Chinese strain of leishmania is less infective to Phlebotomus than the Indian strain, and it is suggested that this difference is correlated with the greater chronicity of the disease in China. In feeding experiments with infected hamsters, it was noted that one particular animal, which was subsequently found to have a heavy skin infection, led to the infection of practically every one of 100 *P. major* var. *chinensis* and 72 *P. sergenti* which fed on it. Furthermore, the intraperitoneal injection of flagellates from both these sandflies produced infection in hamsters. The sections of the skin of the hamster on which the flies were fed showed large numbers of clasmatocytes filled with parasites. The experience gained with this animal and others indicated a correlation between skin infection and infectivity to sandflies. It would appear that in most cases in which sandflies become infected the parasites have been taken up from the skin. The possibility of infecting sandflies by feeding them on hamsters may depend on another factor, namely the infectivity of the strain of parasite. It was noted that the hamsters inoculated from five well advanced cases of kala azar did not all give the same result as regards the percentage of sandflies which became infected. In one case, though there was a high degree of virulence to the hamster of the strain inoculated there was an almost complete lack of infectivity to the sandfly. It is thought that this factor may influence the spread of the

disease in nature. Nothing, however, is said about the degree of skin infection in these hamsters, a factor which the author has already shown to be of importance.

A number of feeding experiments with known infected *P. major* var. *chinensis* did not lead to infection of hamsters. Intraperitoneal injection of flagellates from both sandflies produced infection, but intracutaneous injections did not. Of 124 hamsters inoculated intraperitoneally with the whole contents of varying numbers of infected *P. major* var. *chinensis*, 7 became infected, while of 41 similarly inoculated with the contents of infected *P. sergenti*, 2 became infected.

It appears probable, from the fact that kala azar occurs in infants of such an age that they could not possibly have been exposed to the bites of sandflies, that congenital transmission occurs. In one case an infant four months old was found to be suffering from the disease, which was stated by the mother to have been noticed on account of the increase in size of the spleen two months before. The child had been born after the close of the sandfly season, and though there was no evidence that the mother was infected it is concluded that the infant had probably been infected before birth. The condition of enlargement of the spleen in endemic areas is well recognized by the inhabitants, who term it Nai P'i or milk spleen. Cases with this condition are known to have recovered without treatment so that it would appear that not only is the disease transmitted congenitally, but numbers of cases recover. Spontaneous recovery of hamsters experimentally infected may also occur.

C. M. W.

WENYON (C. M.). **Kala-Azar and Oriental Sore: the Problem of Transmission.**—*Brit. Med. Jl.* 1928. Sept. 29. pp. 558–562.

This paper is a review of the present position of the transmission problems of kala azar and oriental sore in the light of recent discoveries. As flagellates of the leptomonas type are essentially parasites of insects there is every reason to suppose that the parasites of those diseases which assume the leptomonas form in cultures have some insect host. The flagellates peculiar to insects lead to infection of the hind gut and pass from one host to another by small encysted forms voided in the faeces. It might have been expected that the leishmania in the insect host would similarly develop in the hind gut, but in sandflies of the genus *Phlebotomus*, which are the only insects in which a satisfactory development of leishmania has been found to occur, the development is in the stomach with a tendency for the leptomonads to pass forwards along the proboscis. If the sandfly is the original insect host of the parasites it has to be assumed that a development in the hind gut has been altered to one in the anterior part of the alimentary tract. It is possible, however, that the sandfly is not the original insect host and that flagellates from it having established themselves as leishmania in man have led to a secondary infection of the sandfly. It is suggested that a similar explanation may hold in connexion with the anterior development of pathogenic trypanosomes in tsetse flies, since in what appear to be the more primitive trypanosomes development in the invertebrate is also in the hind gut. It is noted that though up to the present all attempts to transmit kala azar or oriental sore by the bite of infected sandflies have failed, it is known that flagellates escape from the proboscis of such flies when they feed and that the flagellates

removed from flies by dissection are capable of producing infection when injected into animals or human beings. If all attempts at transmission by the bite fail, then attention should be paid to the possibility of infection occurring through crushing of infected sandflies on the skin and the conveyance of virus to the mouth or conjunctiva. Such methods of infection occur in the case of relapsing fever and lice. As regards the possibility that the leishmania passes directly from man to man without the intervention of an insect host, though it is known that infection by the mouth can occur in this manner in experimental animals, the extraordinary development of leptomonas in cultures and in the sandfly would be quite unintelligible if such a method of direct transmission occurred. There seems every reason to suppose that the leptomonas stage must form part of the life cycle of leishmania and if so it almost certainly occurs in some insect, for the leptomonas are incapable of developing or surviving in water or outside the body of an insect host, unless as the small encysted forms which infected insects void in their faeces. Such encysted forms do not appear in sandflies infected with leishmania, so that at present it seems that the flagellates in the sandfly produce infection, though their method of gaining access to the body of man in sufficient quantity to lead to infection is not yet clear.

C. M. W.

Indian Medical Gazette. 1928. Aug. Vol. 63. No. 8. pp. 486–490.—**Report on the Kala-Azar Survey in Patna City, August-November 1923.** By Lieut.-Col. William C. Ross, I.M.S., Director of Public Health, Bihar and Orissa, Patna: Superintendent, Government Printing, Bihar and Orissa, 1928.

The writer (L. E. N.) criticizes the Report of Col. W. C. Ross on the kala azar survey which he made in Patna City, and which was noted in this *Bulletin*, Vol. 25, p. 856. He points out that it is unfortunate that Ross, who had made his survey in 1923 (a fact not noted by the reviewer) and had come to the conclusion that the disease was not transmitted by biting insects, did not publish his report till 1928, though he must have been aware that all the energies of the Kala Azar Commission in India were concentrated on proving that some biting insect was responsible for its spread. Owing to the fact that no account is taken of cases of the disease which did not apply for treatment or were treated elsewhere than at the hospital, the computed incidence of 6·5 per thousand is probably an under estimate rather than an over estimate as suggested. Furthermore, it is stated that, though the cases seen were mostly in males, it is probable that actually the two sexes are affected equally. If this be so, then it is evident that calculations based on the number of cases seen must be erroneous. If allowance be made for this by addition to the totals to bring the cases amongst the two sexes to the same level, then the figure becomes 10 in place of 6·5 per thousand. The Report emphasizes the rarity of multiple infections in households in Patna City. This is contrary to the experience in Calcutta and is possibly explained by the fact that the survey covered a very short period only—August to November, 1923. There can be no doubt that there is a slight preponderance of the disease amongst Mohammedans as compared with Hindus. Here again Ross makes no allowance for the sex question. If cases in males alone are considered, the figures are not 10·6 and 5·2 per thousand, but 3·7 and

2·9, a not very striking difference when it is realized that only 113 cases were involved. It is assumed that the only difference between these classes is in eating habits, but the writer notes that there are many other possible explanations—for instance the surroundings of one class may be more congenial to some particular biting insect than those of the other. Commenting on the age incidence, the Report states in reference to recorded observations, " all of them have made a point of the extraordinary prevalence of the disease amongst children and adolescents " and concludes that from the Patna figures " it at once appears that kala azar is not so predominantly a disease of children as has previously been thought." The writer notes that the percentage of total cases in each age group, corrected according to distribution of general population calculated from the figures in the Report, is under 10, 3·6; 10–20, 37·0; 20–30, 21·8; 30–40, 6·1; over 40, 2·9, while the figures (uncorrected) for the Assam dispensary, published by the writer in his book in 1927, for the same age periods are, 30·76, 37·8, 18·0, 9·7 and 3·8. These do not appear to be very strikingly different from those obtained for the Report. As regards the more frequent occurrence of multiple infection in dilapidated masonry houses, the writer and the Report are in agreement. It is somewhat remarkable that the incidence of the disease in houses with satisfactory privies was 4·84 per hundred houses, 2·04 in houses with unsatisfactory privies, and only 1·52 in houses without privies. This appears anomalous, for if the privy had any relation to the disease, it might be expected that the unsatisfactory privy would conduce to a greater spread of the disease than the satisfactory one. As all the houses with privies were masonry houses, it would seem that the character of the building and not the privy was the important factor.

The writer concludes by stating that Col. Ross has shown that the epidemiology of kala azar in Patna is similar to that of the disease in other parts of India, especially Bengal, but that he cannot follow him when he assumes that all the observations he has made point to the fact that kala azar is not transmitted by biting insects, but that infection takes place by way of the intestinal tract.

C. M. W.

Casas (U.), de Buen (S.) & Rodriguez (R.). Algunas consideraciones sobre setenta y tres casos de leishmaniosis visceral. [**Seventy Three Cases of Kala Azar.**]—*Medicina Países Cálidos.* Madrid. 1928. Nov. Vol. 1. No. 6. pp. 515–522.

The paper gives an account of 73 cases of kala azar treated at the anti-malaria station of Navalmoral de la Mata, Caceres, Spain. The majority of the cases were in young children one to three years of age, while from the point of view of symptomatology the disease was of the usual type. The cases were treated with tartar emetic or one or other of a series of organic antimony derivatives. Of 50 cases in which treatment was completed 6 were given tartar emetic with two deaths, 18 stibenyl with 8 deaths, 15 Bayer, 211, 212, etc., with 2 deaths, and 2 relapses, 7 antimosan with 2 deaths, 3 estibosan and 1 Bayer 693 with no deaths. The highest death rate, 33·3 per cent., was in children under one year of age. It was 26·8 per cent. in those from one to three years of age, and 22·2 per cent. in those from four to seven.

C. M. W.

Ortega Corrochano (David). Cien casos de leishmaniosis visceral (kala-azar). Estudio clinico y terapeutico. [**One Hundred Cases of Kala Azar.**]—*Medicina Países Cálidos.* Madrid. 1928. Nov. Vol. 1. No. 6. pp. 507–514.

Since the establishment of the anti-malaria dispensary at Jefe in the South of Spain in July 1928 there have been diagnosed by spleen puncture about 100 cases of infantile kala azar. In this paper are given, mostly in a large table, certain details of 102 cases. Treatment was carried out by various antimony compounds and the results which are given of 94 cases show that 11 were lost sight of, 30 died and 53 were cured.

C. M. W.

Covisa (J. S.) & Gonzalez Medina (R.). Leishmaniosis visceral y cutaneo-mucosa. [**Case of Visceral and Mucocutaneous Leishmaniasis.**]—*Medicina Países Cálidos.* Madrid. 1928. Nov. Vol. 1. No. 6. pp. 551–557. With 4 text figs.

The paper describes a case of kala azar in a boy in Spain, fourteen years of age. The special feature of the case was a severe ulceration of the upper lip, both the skin and mucosa being involved. Puncture of the spleen revealed numerous leishmania while examination of a portion of the ulcerated area showed ovoid bodies which had the appearance of parasites. It is concluded that this is an instance of muco-cutaneous leishmaniasis in a case of kala azar. [The evidence that the lip lesion contained actual leishmania is unsatisfactory, the case having the appearance of one of cancrum oris, a not infrequent complication of kala azar.] The case responded to appropriate treatment with tartar emetic.

C. M. W.

Patanè (Carmelo). Il posto attuale della Cirenaica nell' epidemiologia delle leishmaniosi nel Nord Africa. [**Distribution of Leishmaniasis in Cirenaica compared with Other Parts of North Africa.**]—*Arch. Ital. Sci. Med. Colon.* 1928. Feb. Vol. 9. No. 2. pp. 69–83. With 1 folding map. [7 refs.]

The author discusses the distribution of leishmania infections on the north coast of Africa. Of the various districts—Morocco, Algeria, Tunisia, Tripolitania, Cirenaica and Egypt—Cirenaica appears to be the least affected. During a long experience of the country and a careful search there have occurred only single cases of kala azar, canine kala azar and oriental sore. The immunity from these diseases appears to be correlated with a very low sandfly density. As regards kala azar, only 93 cases have been recorded from the whole of North Africa. In Tunis with 172,000 inhabitants, 32 cases were noted between 1905 and 1927. On the other hand in Catania with a population of 271,000, there were registered from 1909 to 1926 as many as 681 deaths from the disease, while at the Clinica Pediatrica between 1910 and 1925 there were seen 1,424 cases of which 1,164 were in children from the city itself. Though of great interest in North Africa it is evident that kala azar is of less importance than in other parts of the Mediterranean, as for instance Sicily.

C. M. W.

Giraud (Paul) & Massot (Marc). Le kala-azar infantile en France. Nouvelles considérations épidémiologiques et thérapeutiques. [**Infantile Kala Azar in France. Epidemiology and Therapeutics.**] —*Arch. Méd. des Enfants.* 1927. Sept. Vol. 30. No. 9. pp. 505–514. [6 refs.]

In an earlier publication (*Arch. Méd. des Enfants*, Apr., 1926) all the cases of kala azar which had been reported in France up to December, 1925, were reviewed by the authors. Since then ten further cases of the disease in children have come to their notice. One of these was observed in Toulon in 1923 ; the others were in children who had never left Marseilles or its immediate surroundings. The ten new cases bring the total of cases observed in France to 43, of which 34 were from the Marseilles district. The disease has shown no sign of increasing, for the figures for the four years 1923–1926 are 8, 9, 9, 8. Cases have been recorded from Marseilles, Cassis, Toulon and Nice, and one, diagnosed clinically only, from Mentone. One such case of Corsican origin was noted by the authors. It is noteworthy that there are no records of the disease from between Marseilles and Spain where it is common. It seems probable that more careful search will reveal the disease in this district. In the Marseilles region the cases are always sporadic and mostly arise in the districts around the town. From the observations of Oriol and Pringault it is known that canine kala azar is fairly common in Marseilles, while Rosier has noted its frequency in Grasse. There does not appear, however, to be any reason to suspect dogs as the source of human infection. As regards the vector, the authors note that in one case at least fleas and bugs could be excluded, though there was definite exposure to mosquitoes and sandflies. C. M. W.

Spyropoulos (N. J.). Betrachtungen und Ergebnisse der "Kala-Azar"-Erkrankungen des kindlichen Alters. (Unter Zugrundelegung eines Materials von 96 Fällen). [**Kala Azar in Ninety Six Children.**]—*Med. Klin.* 1928. Nov. 30. Vol. 24. No. 48 (1251). pp. 1865–1866. With 1 chart in text. [Children's Clinic, Univ., Athens.]

The author gives his experience with 96 cases of infantile kala azar seen at the children's clinic of the University of Athens. Of the 96 cases, 48 were in the first year of life, 42 in the second and 6 in the third. The youngest was in a child 6 months old. Treatment was carried out with a brand of tartar emetic sold under the name of stibyal. Injections were usually made in the jugular vein on alternate days, the dose being 0·01 gram for each year of life. In cases which recovered the number of injections varied from 20 to 50. Of the 96 cases only 57 were followed completely, and of these, 72 per cent. recovered. It is noted that an increase in the number of leucocytes is an indication that treatment is having the desired effect. The presence or absence of parasites in the spleen after treatment has been completed does not appear to bear any relation to ultimate recovery. C. M. W.

Napier (L. Everard). **A Spleen-Puncture Syringe.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 149–152. With 5 figs. on 1 plate. [1 ref.]

In performing spleen puncture for the diagnosis of kala azar it is necessary for the spleen to be immobilized. This requires two persons,

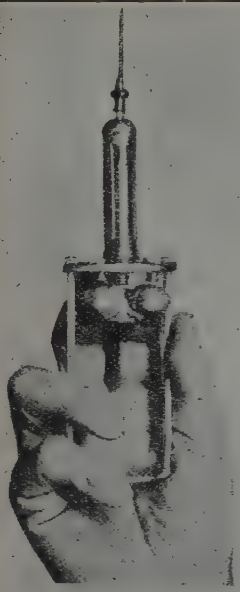


Fig. 1.

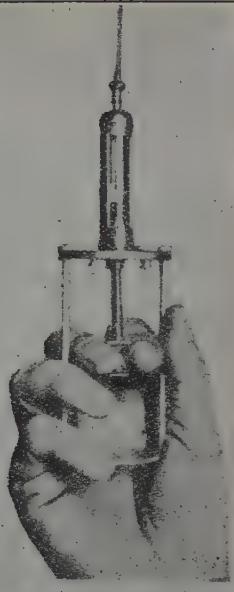


Fig. 2.

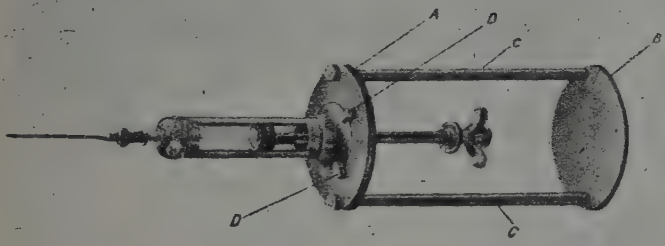
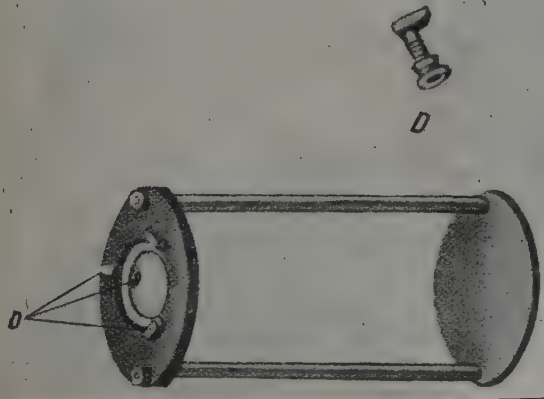


Fig. 3.



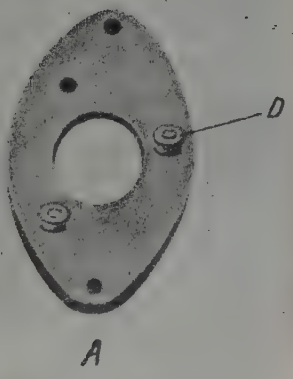


Fig. 5.

A spleen-puncture syringe attachment to enable a syringe to be operated by one hand. A and B are oval metal plates (5 cm. by 3·5 cm.) held parallel by two metal tie rods C (9·8 cm. long). Plate A has a recessed hole in which the collar of a 5 cc. Roux syringe is kept in place by three locking bolts D.

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one to hold the spleen and the other to puncture. With a view to obviating the necessity for two persons, a special holder for the syringe was devised so that the operator could hold the spleen with one hand and perform the puncture with the other. The particular holder illustrated was made for a 5 cc. Roux syringe. The syringe is held in one hand and by a movement of the fingers the plunger can be withdrawn and released rapidly three or four times in a second, without altering the grip or moving the syringe. C. M. W.

NAPIER (L. Everard). **A Critical Examination of the Antimony Tests for Kala-Azar.**—*Indian Med. Gaz.* 1928. Dec. Vol. 63. No. 12. pp. 687–697. [6 refs.]

The author has made a critical examination of the relative value of the aldehyde test and the antimony test in kala azar. The latter can be carried out in two ways—by the original antimony method in which a 4 per cent. solution of urea stibamine is added to serum or by the dilution method in which the serum is used diluted with nine times its volume of distilled water. The conclusion is that the antimony test, though much more delicate than the aldehyde test, is not positive in every case of kala azar. In certain cases other than kala azar changes occur in the serum which lead to a positive result. For the test to be made one of clinical value the standard of "positivity" should be readjusted and the condition of the patient taken into consideration.

The following rules are suggested as a guide to the interpretation of the results. When the antimony test alone is carried out, a positive diagnosis should be made only in cases in which the spleen is *less* than six inches below the costal margin and in which there is a strongly positive reaction; that is to say when a solid plug of coagulum, not moved when the tube is tilted and dislodged only by violent agitation, forms at the junction of the two fluids. A negative diagnosis should made only in cases in which the spleen is 3 inches or *more* below the costal margin and in which the serum remains quite clear or becomes cloudy without showing definite flocculation. When the dilution method is used a positive diagnosis should be made only when the spleen is *less* than six inches below the costal margin and when there is a strongly positive reaction with a heavy flocculent precipitate. A negative diagnosis should be made if the spleen is six inches or *more* below the costal margin and the reaction is negative or doubtful with no definite flocculation. When both tests are applied a positive diagnosis should be made when the antimony test is strongly positive in cases in which the spleen is *less* than six inches below the costal margin or in any case in which the dilution method gives a strongly positive reaction. A negative diagnosis should be made when the antimony test is negative or doubtful in any case in which the spleen is three inches or *more* below the costal margin or when the dilution method gives a negative or doubtful reaction in any case in which the spleen is 6 inches or *more* below the costal margin. C. M. W.

CHOPRA (R. N.) & CHAUDHURI (S. G.). **Studies in Physical Properties of Different Blood Sera. Part II. Surface Tension.**—*Indian Jl. Med. Res.* 1928. Oct. Vol. 16. No. 2. pp. 447–456. [21 refs.] [Calcutta School of Trop. Med. & Hyg., Calcutta.]

Investigating the surface tension of sera in certain diseases, it was found that this was lowest in tuberculosis and kala azar. It appears

probable that this is due to the greater concentration of euglobulin in these sera. In Ray's kala azar test the addition of water to red blood corpuscles does not cause complete haemolysis. This is explained as a precipitation of euglobulin on to the surface of the corpuscles as a protective covering. Similarly in Bramachari's precipitation test the precipitate which forms when kala azar serum is diluted with water is euglobulin which cannot remain in solution when the concentration of the inorganic salts is lowered. This, however, is not the only factor causing precipitation of euglobulin. With dilution of the inorganic salts there is a lowering of pH which in itself helps to throw the euglobulin out of solution.

C. M. W.

Lloyd (R. B.) & Paul (S. N.). **Serum Changes in Kala Azar.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp.. 203–219. With 6 graphs in text. [53 refs.]

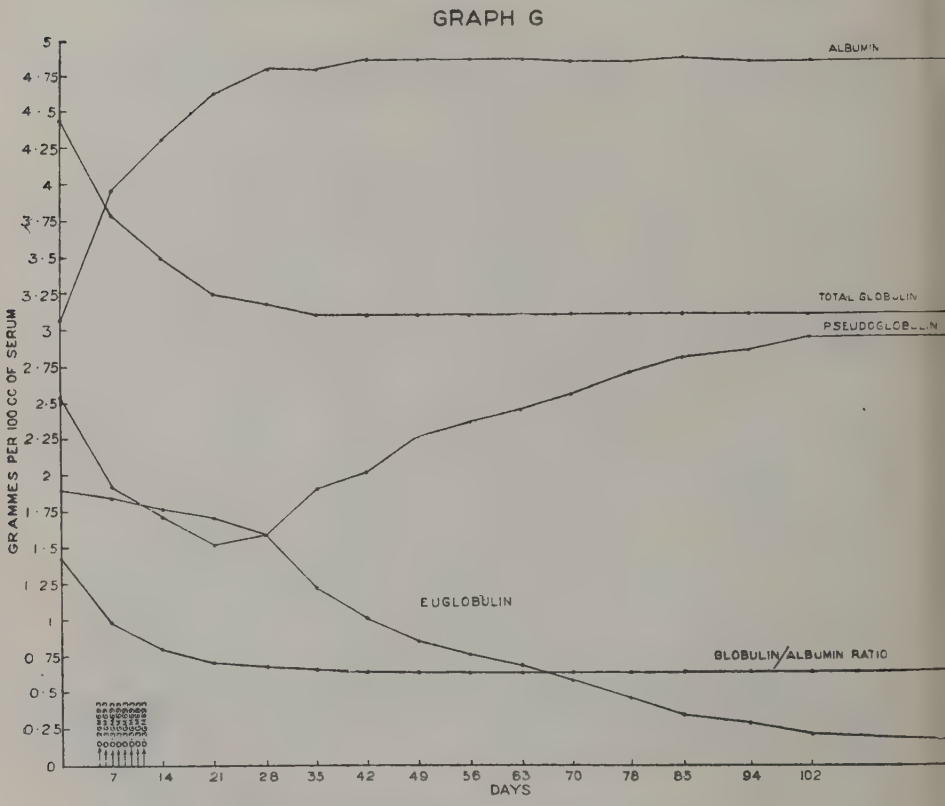
The investigations described were directed to a discovery of an explanation of the formol-gel or aldehyde test for kala azar. It is concluded that the reaction is of a double nature, one part of which is specific and associated with the euglobulin fraction of the serum. The other is non-specific in that the pseudoglobulin plus albumin fraction of kala azar serum and other sources may function in this capacity. The reaction is thus analogous to complement fixation, though the non-specific factor is not complement since it is not destroyed by inactivation. Euglobulin prepared by dialysis from normal serum will not give the reaction, a fact which suggests that in kala azar there is present a special euglobulin though the association with euglobulin of some non-proteid specific substance cannot be excluded. In kala azar there is a considerable increase of the total serum globulin and of the euglobulin fraction at the expense of the serum albumin, so that the globulin-albumin ratio, which is normally 0·66 becomes raised in some cases to 2·9. Treatment of well established cases of kala azar with von Heyden's 693 results in an immediate change, so that after eight injections the ratio has fallen to normal. The curve showing the fall in a favourable case is a perfectly smooth one. The information so far available suggests that the protein graphs may be employed for the evaluation of any particular drug used for the treatment of kala azar. By the refractometric method the ratio can be determined in two hours.

C. M. W.

Lloyd (R. B.) & Paul (S. N.). **Protein Graphs in Kala-Azar.**—*Indian Jl. Med. Res.* 1928. Oct. Vol. 16. No. 2. pp. 529–535. With 8 graphs. [2 refs.]

The euglobulin content of normal serum is 0·16 gm. per 100 cc. or approximatly 5 per cent. of the total globulin. In a well-established case of kala azar it varies from 1·5 to 2·5 gm. or from 40 to 50 per cent. of the total globulin. When treatment with von Heyden 693 is instituted, there is at first a marked and rapid fall in the total globulin and pseudoglobulin while the albumin shows an equally sudden rise, the total globulin and albumin curves crossing to form what is termed the X curve. During this process the euglobulin undergoes very little change, so that the curve of the rapidly falling pseudoglobulin soon crosses that

of the euglobulin. At a later stage of the treatment the pseudoglobulin begins to rise again so that its curve crosses that of the euglobulin a second time. This intersection of the curves represents the point at which the globulin and albumin first stabilize themselves, or in other words the point at which the globulin-albumin ratio first becomes normal. From this point onward, the pseudoglobulin curve rises steadily till it nearly touches that of the total globulin, the euglobulin falling to the normal of 0·16 gm. The form of these curves is very characteristic and is shown with minor variations in every case the serum of which has been examined. They appear to express



A typical protein graph in Kala Azar.
[Reproduced from the *Indian Journal of Medical Research.*]

some deep-seated change which occurs during treatment while from their regular appearance it would seem likely that they may be used as a serological standard for the control of treatment of kala azar as the Wassermann reaction is used for the control of the treatment of syphilis.

It is pointed out that a special euglobulin appears to be present in kala azar. This substance or substances precipitated with it are the fundamental cause of the formol leuco-gel reaction in kala azar. It may be possible to regard the decrease in euglobulin which occurs as a result of treatment as an expression of the fading formol leuco-gel reaction.

C. M. W.

Hodgson (E. C.), Sen (Ram Taran) & Das (C.). **Studies of the Effects of Antimony Salts. No. 2. The Effect of Aminostiburea on Cases of Kala-Azar.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 31–33.

The paper describes the treatment of eighteen cases of kala azar with aminostiburea, manufactured by the Union Drug Co. of Calcutta. In all cases a commencing intravenous dose of 0·05 gm. was given and this was followed by doses every second day in increasing amounts till 0·2 or 0·3 gm. doses were reached. The ages of seventeen of the patients varied from 9 to 36 years—one was 62 years of age. The amount of drug administered to each case varied from 1·5 gm. to 6 gm. and the duration of treatment from 17 to 55 days. In all cases a cure was obtained. It is concluded that the drug is a valuable addition to those already discovered.

C. M. W.

Napier (L. Everard). **The Pentavalent Compounds of Antimony in the Treatment of Kala-Azar. Part III. Aminostiburea : an Analysis of the Treatment in 52 cases.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 141–147.

The author describes the treatment of 52 consecutive cases of kala azar with aminostiburea which has a low relative toxicity to white mice and is well tolerated by man in comparatively large doses. Of the cases, 48 were discharged as cured, 2 died during treatment, and 2 failed to respond to the drug. Of the 48 described as cured, 38 were known to be in good health six months later, 8 were not traced and 2 had died. The mean of the total dose given to the 38 patients was 2·55 gm. To 30 of these who had had no previous treatment the mean total dose was 2·23 gm. It is calculated that in a mixed population a total dosage of 2·3 gm. per patient or 3·31 gm. per 100 pounds of body weight should produce a cure rate of not less than 90·9 per cent.

C. M. W.

Napier (L. Everard) & Mullick (M. N.). **The Intensive Treatment of Kala-Azar by Neo-Stibosan.**—*Indian Med. Gaz.* 1928. Aug. Vol. 63. No. 8. pp. 445–450. With 1 chart. [3 refs.]

As neo-stibosan (No. 693) proved to be a pentavalent antimony compound of such low toxicity and high curative value that 175 cases of kala azar were treated with only three deaths, the authors made observations on the possibility of reducing the course of treatment to a minimum. To 28 unselected cases daily doses were given for eight days, the first dose being 0·2 gm. and the others 0·3 gm. The result was so satisfactory that the authors conclude that with this short course a high percentage of cures can be expected. The drug can be given with safety intravenously in 25 per cent. solution, though in most instances a 5 per cent. solution was employed. Furthermore, the drug is equally efficacious when given intramuscularly, 0·3 gm. in 25 per cent. solution being isotonic with the tissues and causing less pain than a similarly given injection of 0·063 gm. (1 grain) of emetine.

C. M. W.

Hodgson (E. C.) & Sen (Ram Taran). **Experiments with Vitex Pedunculata in the Treatment of Kala-Azar.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 35–37. [1 ref.]

The plant in question is common in the forests of Assam, Bihar and Orissa, and has a local reputation for curing many diseases, including malaria and kala azar. It was decided to test its action in the latter disease. Treatment was undertaken with decoction (1 to 4 oz.) or infusion (1 oz.) in each case, given orally three or four times a day. In the two cases investigated, there was improvement in the general condition but no cure resulted, the parasites in the spleen increasing steadily in numbers. The cases were subsequently cured with urea stibamine.

C. M. W.

Shortt (H. E.), Craighead (A. C.), Smith (R. O. A.) & Swaminath (C. S.). **Further Transmission Experiments in Kala-Azar with *Phlebotomus argentipes*.**—*Indian Jl. Med. Res.* 1928. Oct. Vol. 16. No. 2. pp. 263–270. [4 refs.]

In a previous paper (this *Bulletin*, Vol. 24, p. 636), Shortt, Barraud and Craighead described attempts to transmit kala azar to white mice and hamsters by the bites of infected *Phlebotomus argentipes*. These experiments had certain limitations. Firstly, the number of presumably infective flies which fed on each animal was relatively small ; secondly, a larger number of the animals was subjected to the second feed of the fly only though it was considered that the third or subsequent feed was most probably the transmitting one ; and thirdly, human beings had not been used. In the series of experiments detailed in the present paper an attempt has been made to meet these objections by employing human volunteers and by subjecting each of them and the animals used to the bites of large numbers of infected flies. The animals used were white mice and Chinese hamsters, and the volunteers were four individuals who had never lived in a kala azar area, who were brought as rapidly as possible to the laboratory on each occasion on which feeding took place and who were taken back immediately to the non-infected area. The numbers of feeds by flies at supposedly the infective stage on the volunteers were 67, 443, 336 and 394 respectively. By dissection of a certain number of these flies after feeding and noting the proportion of those actually infected the probable numbers of feeds by infected flies were estimated as 23, 154, 116 and 137. After a lapse of 20 months there had been no evidence of infection. Similar experiments were made with 22 white mice and 15 hamsters. The feeds of supposedly infected flies on each individual varied from 1 to 938, numbers which were reduced by control dissection to 0 to 283. In the case of the hamsters, the corresponding numbers were 22 and 485 reduced to 7 to 168. In the cases in which the experiment was of short duration, and the number of feeds small the premature death of the animal or its sickness and consequent sacrifice was the cause. The duration of the experiments in the case of the animals varied from a maximum of 470 days to a minimum of 43 days. Though the intensity of exposure to infection was much greater than could ever obtain in nature in Assam the results were entirely negative.

C. M. W.

SHORTT (H. E.), CRAIGHEAD (A. C.), SMITH (R. O. A.) & SWAMINATH (C. S.). **Infection of Hamsters** (*Cricetulus griseus*) **with** *Leishmania donovani* **by the Oral and Conjunctival Routes.**—*Indian Jl. Med. Res.* 1928. Oct. Vol. 16. No. 2. pp. 271–274. [10 refs.]

The experiments recorded refer to two Chinese hamsters. An emulsion of liver and spleen of an infected hamster was made. By means of a pipette about 0·2 cc. of the emulsion was allowed to drop into the mouth of one animal and a few drops into the eye of the other. Both animals remained in good condition and were killed at the end of the year (April 16th, 1927–April 14th, 1928). In both animals the spleen was enlarged to four times the normal size. Parasites were found in the spleen, liver and bone marrow.

C. M. W.

BUROWA (L.). [**The Rickenberg's Reaction of the Leishmaniosis.**]—*Pensée Méd. d' Usbékistane.* Tashkent. 1928. Oct. No. 1. pp. 20–28. [7 refs.] [In Russian. English summary p. 100.]

The sera of mice inoculated with strains of leishmania were tested against cultures for the Rieckenberg reaction. It was noted that the serum of healthy mice may show this phenomenon with *L. tropica,* but that its intensity is increased by inoculating them with strains of this organism. By the test, however, it was possible to differentiate between *L. donovani* and *L. tropica.* The specificity of this test seems doubtful in view of the action of the serum of healthy mice.

C. M. W.

CHODUKIN (N. I.) & SCHEWTSCHENKO (F. I.). [Die Hauterscheinungen bei der Leischmaniose der Hunde.] [**The Skin Lesions in Canine Leishmaniasis.**]—*Pensée Méd. d' Usbékistane.* Tashkent. 1928. Oct. No. 1. pp. 29–38. [14 refs.] [In Russian. German summary p. 100.]

The authors, from an experience derived from post-mortems on 4,000 dogs in Tashkent, have come to the conclusion that cutaneous leishmaniasis as distinct from kala azar does not exist in these animals. It is merely a symptom of a generalized infection. They have seen dogs in which the skin lesions were the prominent feature while the generalized infection produced no noticeable symptoms. In other cases there were skin lesions associated with scanty parasites only in one particular organ—spleen or bone marrow. In a large percentage of apparently healthy dogs leishmania were found in the sebaceous glands or hair follicles. They compare the cutaneous lesions of dogs with the infection of the skin as described by HU and CASH in hamsters inoculated with the parasite of kala azar and with the dermal leishmanoid first recorded by BRAMACHARI in human cases of kala azar in India.

The authors believe that the canine parasite is not a distinct species, *Leishmania canis,* but is identical with *L. donovani.* This conclusion is supported by serological tests.

C M. W.

Chodukine (N. J.) & Soffieff (M. S.). [Sur la question d'identité de la *L. donovani* et *L. canis.*] [**Question of Identity of** *L. donovani* **and** *L. canis.*]—*Pensée Méd. d' Usbékistane.* Tashkent. 1928. Oct. No. 1. pp. 5–19. [5 refs.] [In Russian. French summary p. 99.]

With the serum of immunized mice, guineapigs and rabbits, the authors have carried out a series of serological tests with strains of leishmania. As regards the Rieckenberg or adhesion phenomenon, no difference could be detected between cultures of *L. tropica, L. donovani, L. canis* and the cutaneous form of *L. canis.* By adding immune serum to cultures it was found that an anti-donovani serum lysed *L. donovani* and both the visceral and cutaneous *L. canis* but not *L. tropica.* Conversely an anti-tropica serum lysed the homologous *L. tropica* but not the others. Agglutination and absorption tests gave similar results. The conclusion is that *L. donovani* and *L. canis* are identical but distinct from *L. tropica.* The cutaneous strain of *L. canis* is related to *L. canis* but the question of identity is still open to dispute.

C. M. W.

Khodukin (N. I.). [**Kala-Azar in Tashkent in Connection with the Epidemiology of Leishmaniasis in Dogs.**]—*C.R. Acad. Sci. U.R.S.S.* Leningrad. 1928. No. 13. pp. 246–250. [In Russian. Summarized in *Rev. Applied Entom.* 1929. Jan. Vol. 17. Ser. B. Pt. 1. pp. 9–10.]

Observations on canine and infantile kala azar in Samarkand showed that these diseases were most prevalent in the spring, especially in May. As regards sandflies the following species were encountered : *Phlebotomus papatasii, P. perniciosus, P. sergenti, P. li, P. major, P. minutus* and two varieties of the last. About 600 sandflies were fed on the sores of infected dogs. Of those which survived 2·8 showed on dissection infection with herpetomonads. They were first noted on the fourth day after the feed, were most commonly found on the sixth day and were seen up to the tenth day. No sandflies were found naturally infected. The low percentage of infections obtained is explained by the fact that the sandflies used included *P. sergenti,* which the author erroneously believes previous writers have found to be immune to infection with *Leishmania donovani.*

C. M. W.

Adler (S.) & Theodor (O.). **Infection of** *Phlebotomus sergenti* **with** *Leishmania tropica.* [Correspondence.]—*Nature.* 1928. Aug. 25. Vol. 122. No. 3069. p. 278.

Working with *Phlebotomus sergenti* in Baghdad the authors have found that the flies can be infected by feeding them on cultures of *Leishmania tropica* exactly as in the case of *P. papatasii.* Later in Mosul, 17 laboratory bred *P. sergenti* were fed on a case of oriental sore, and of these 11 became infected. Two wild female *P. sergenti* out of a total of 683 dissected, were found naturally infected in the cardia and stomach. Material from one of these was inoculated into the skin of a volunteer, who up to the date of writing had shown no sign of infection. It appears probable that *P. sergenti* is a vector of cutaneous leishmaniasis. A survey of its distribution in Baghdad suggests that it is the main carrier in some districts. In experiments subsequently carried

out in Jerusalem, it was found that in specimens of *P. sergenti* infected by feeding on man, the flagellates extended more than half-way down the proboscis after six days at 27° C. Such an extension of the flagellates beyond the cardia was not noted by PATTON and HINDLE when this sand fly was experimentally infected with *L. donovani* in North China.

C. M. W.

ADLER (S.). **A Note on the Transmission of *Leishmania tropica* directly from Sandfly (*Phlebotomus papatasii*) to Sandfly.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Aug. 22. Vol. 22. No. 2. pp. 177–178. [1 ref.] [Microbiol. Inst., Hebrew Univ., Jerusalem.]

The author has already described how sandflies can be infected with leishmania by allowing them to feed on cultural forms through a rabbit skin membrane. It is now shown that by allowing sandflies to feed in a similar manner on sterile saline solution to which has been added a little inactivated defibrinated rabbit's blood and flagellates which have been removed without bacterial contamination from already infected sandflies, infection results. It has thus been possible to pass the organism directly from one sandfly to another. It is possible that the same may apply to other insect borne viruses, and that by the method described or modifications of it, it would be possible to maintain a virus without having to pass it through its vertebrate host.

C. M. W.

SHORTT (H. E.), D'SILVA (H. A. H.) & SWAMINATH (C. S.). **Note on Dermal Leishmanoid.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 239–240. [1 ref.]

By feeding sandflies, *Phlebotomus argentipes*, on a cutaneous lesion in a case of dermal leishmanoid in which leishmania had been demonstrated, it was shown that the insects became infected, and that the parasite developed in the same manner as *Leishmania donovani* from cases of kala azar. This affords evidence of the identity with *L. donovani* of the parasite found in the skin lesions.

C. M. W.

MARZINOWSKY (E. I.). L'immunité dans le bouton d'Orient. [**Immunity in Oriental Sore.**]—*Bull. Soc. Path. Exot.* 1928. Oct. 10. Vol. 21. No. 8. pp. 638–641. [9 refs.]

In 1904 the author inoculated himself with *Leishmania tropica* from a case of oriental sore. After an incubation period of 70 days, a small papule appeared and in it 17 days later parasites were demonstrated. After a further three weeks the nodule was excised. Seven years later the author was again inoculated. At the site of inoculation there developed redness and oedema and finally suppuration on the ninth day. Three weeks later healing had taken place. Smears from these lesions revealed diplococci and degenerate leishmania, which persisted to the sixteenth day. At about the time of the author's second inoculation, another doctor had inoculated himself and acquired a typical sore containing numerous leishmania. With material from this sore the author inoculated himself a third time. On the thirteenth or fourteenth day there was induration at the site and this developed into

a nodule and ulcerated. A marked lymphangitis also appeared. Numerous parasites were obtained from the ulcer. Healing took place in five months. With material from the ulcer, four other people were inoculated. In each case a typical sore developed after an incubation period of fifteen days. The doctor referred to above, reinoculated himself two months after the lesion produced by his first inoculation had healed. No sore resulted. Since his last experience, the author has attempted to reinfect himself on four occasions without success. On another occasion 4 cc. of a culture of the organism were inoculated subcutaneously in the arm. This was followed by a somewhat violent inflammatory reaction which subsided on the fifth day, leaving a small induration which subsequently disappeared. A monkey which had been inoculated subcutaneously with 3 cc. of the same culture in the supraorbital region, died on the ninth day. In smears of the bone marrow, a few leishmania were found. From the experiments recorded it is evident that an immunity against oriental sore results from infection, and that this may persist for at least seven years.

C. M. W.

ALBERNAZ (Paulo Mangabeira). O "Polypo da laichimaniose." [**The Polypus of Leishmaniasis.**]—*Brasil-Medico.* 1928. July 7. Vol. 42. No. 27. pp. 729–737. With 6 text figs. [24 refs.]

The author mentions four cases of muco-cutaneous leishmaniasis in which nasal polypi occurred. The cases have been previously referred to by him, and though he had regarded the polypi as due to the leishmania infection, he had admitted that in the absence of histological examination the proof was not complete. He now gives a detailed and illustrated account of the histology of the polypi. Though they were similar in outward appearance to simple polypi and those encountered in the nose in syphilis and tuberculosis, structurally they differed from these, as also from the usual mucosal lesions due to leishmaniasis, the histology of which was described by KLOTZ and LINDENBERG. On this account the author feels that his original contention that the polypi were to be regarded as manifestations of the leishmania infection is correct.

C. M. W.

LERAT (R.). La guérison du bouton d'Orient par une nouvelle thérapeutique, le "synectol." [**Cure of Oriental Sore by Synectol.**] —*Bull. Soc. Path. Exot.* 1928. Nov. 14. Vol. 21. No. 9. pp. 764–768. With 2 text figs.

Under the name of Synectol the author describes an ointment which is prepared from the extract of various plants (*Cupressus sempervirens, Plumbago europoea, Mesembryanthemum cristallinum, Teucrium chamoedrys, Plantago lanceolata*). It is applied to the sore after removal of the scab at a temperature of 100° to 120° C. It produces for a second, a sensation of heat, but it does not burn. Two days later the first application is removed and a fresh one made at a temperature of 60° to 80° C. Two further applications are made at two day intervals. By this time the lesion has been sterilized of parasites, and will heal without scarring.

C. M. W.

Talaat (A.). Die Behandlung der Orientbeule mit 661 und 471. [**Treatment of Oriental Sore with 661 and 471.**]—*Dermat. Woch.* 1928. Feb. 25. Vol. 86. No. 8. pp. 262–264.

The paper describes four cases of oriental sore which responded rapidly to treatment by intravenous injections of either stibosan 471 or antimosan 661.

C. M. W.

Blanc (Georges) & Caminopetros (J.). Sur quelques cas de bouton d'Orient observés à Athènes. [**Cases of Oriental Sore at Athens.**]—*Grèce Méd.* 1928. Mar.–Apr. Vol. 30. No. 3/4. pp. 9–12. [8 refs.] Also in *Arch. Inst. Pasteur Hellénique.* 1928. Vol. 2. No. 1. pp. 36–48. With 5 text figs. [6 refs.]

In the Archives of the hospital of Syngros there are records of the attendance of 93 cases of oriental sore from 1916 onwards. Of these 60 came from Crete and the remainder from other islands or from the mainland. As 17 cases were from Athens itself, it appeared probable that the disease occurred endemically in the city. A careful survey of a certain quarter (Pangrati) of the city brought to light four cases, two of which were undoubtedly autochthonous. Certain cases of the disease appear to be abortive in that there is little development of the lesions. Such are readily overlooked. As an illustration of this type of the disease, an inoculation experiment is mentioned. A volunteer 40 years of age was inoculated in the deltoid region with serum from a large sore on June 26th, 1925. On November 15th of the same year there were present three tiny papules in which numerous leishmania were demonstrated. A year later the papules were still present, but showed hardly any increase in size. Parasites were still present and a rich culture was obtained.

C. M. W.

Mesnard (J.). Un cas de leishmaniose cutanée (bouton d'Orient). Incubation particulièrement longue. Auto-observation. [**Case of Dermal Leishmaniasis of Long Incubation.**]—*Bull. Soc. Path. Exot.* 1928. Nov. 14. Vol. 21. No. 9. pp. 761–763. [3 refs.] [Pasteur Inst., Hanoï.]

The author describes the appearance of a small nodule on the outer surface of his forearm in September 1927 in Tonkin. He had lived in Persia from 1920 to September, 1924, when he returned to France via Baghdad, Palmyra, Damascus and Beirut. He resided in Paris and Anjou till his departure for Tonkin in December, 1925. The nodule increased in size till in March, 1928, it measured 3 cm. in diameter. Owing to the fact that oriental sore is unknown in Tonkin examination for leishmania was not made till, at the sixth month, being struck by the resemblance to lesions he had seen in Persia, the author made a search for these parasites. They were discovered in large numbers and a culture was obtained. The point of interest is the long incubation period. Infection must have occurred before September 1924, or shortly after this during the journey to France through endemic areas or as a result of an inoculation into the skin of the forearm of cultural forms of *Leishmania tropica* which was made at the beginning of 1923. In the one case the incubation period would be three years, in other, four and a-half years.

C. M. W.

Buss (G.). Psoriasis und Hautleishmaniose. [**Psoriasis and Cutaneous Leishmaniasis.**]—*Arch. f. Schiffs- u Trop.-Hyg.* 1928. Aug. Vol. 32. No. 8. pp. 391–401. With 6 text figs. [11 refs.] ["Kaiser-Wilhelm" Society for Advancement of Science, São Paulo, Brazil.]

The paper describes the case of a man 36 years of age who became infected with the parasite of cutaneous leishmaniasis after having suffered from generalized psoriasis for 9 years. An ulcer developed in the leg and three months later there appeared on various parts of the body affected with psoriasis over 300 small nodules some of which, after increasing slightly in size, ulcerated. Examination of many of these lesions revealed the presence of leishmania. It would appear that the primary leishmania lesion was in the leg and that the simultaneous development of the nodules is an indication that the parasites were distributed by the blood stream.

C. M. W.

Pons-Leychard (A.). Chronique du bouton d'Orient en Algérie. Un troisième cas de bouton d'Orient dans le Tell oranais (le 32e en Algérie, hors des régions sahariennes). [**Third and Fourth Cases of Oriental Sore in the Tell.**]—*Arch. Inst. Pasteur d'Algérie.* 1928. Mar. Vol. 6. No. 1. pp. 23–24.

Raynard (Lucien) & Colonieu (L.). Un nouveau cas de bouton d'Orient contracté dans le Tell.—*Ibid.* p. 25. With 1 plate.

These two papers describe the 32nd and 33rd cases of oriental sore in which infection was acquired outside the large endemic area of the Sahara.

C. M. W.

Panayotatou (Angélique). Sur un cas de leishmaniose cutanée ou bouton d'Orient de la face. [**Case of Oriental Sore of the Face.**]—*Rev. Méd. et Hyg. Trop.* 1928. July–Aug. Vol. 20. No. 4. pp. 114–118. With 2 text figs. [5 refs.]

A case of oriental sore in a child in Alexandria where the disease is rarely met with (see this *Bulletin*, Vol. 21, p. 259). A cure was effected by injections of emetine round the sore and application of dressing soaked in a solution of this drug.

C. M. W.

Lanteri (G.). Peculiari forme riproduttive (processo di divisione per strozzamento) della *Leishmania tropica* in un caso di Bottone d'Oriente. [**Peculiar Reproductive Forms of** *L. tropica.*]—*Giorn. Ital. di Dermat. e Sifil.* 1928. June. Vol. 69. Year 63. No. 3. pp. 925–934. With 2 figs. [47 refs.]

In smears from a case of oriental sore the author discovered bodies which appeared to be leishmania reproducing by constriction into two parts. [The figure given of about 30 parasites undergoing this method of reproduction reminds the reviewer of budding yeasts rather than leishmania.]

C. M. W.

Motta (Cunha). A reacção giganto-cellular na leishmaniose tegumentar cutanea. [**Giant Cell Reaction in Dermal Leishmaniasis.**]—*Brasil-Medico.* 1928. Sept. 15. Vol. 42. No. 37. pp. 1034–1036. With 3 figs. [English summary pp. 1036–1037.] [Faculty of Med., São Paulo, Brazil.]

In cutaneous leishmaniasis the cellular reaction may be mainly one of giant cell formation. Giant cells which have no relationship to the

leishmania may be induced by the presence of foreign bodies in the lesions. When these cells occur in lesions which are in process of cicatrization their origin is always of a doubtful nature.

C. M. W.

Salle (A. J.) & Schmidt (Carl L. A.). **The Metabolism of** *Leishmania tropica.*—*Jl. Infect. Dis.* 1928. Nov. Vol. 43. No. 5. pp. 378–384. [25 refs.] [Med. School, Univ. of California, Berkeley.]

By growing *Leishmania tropica* in a standard medium and in media in which certain variations were made the metabolic activities of the organism were determined. They do not differ essentially from those of many bacteria. Carbohydrate exerts a marked sparing action towards the protein. The organism possesses marked proteolytic powers as demonstrated by an increase in the ammonia and split-protein products and rise in pH. The organism cannot survive under anaerobic conditions. The haemoglobin in the medium may function by contributing an accessory food or growth factor.

C. M. W.

Weiss (Pedro). La espundia es una leishmaniasis tegumentaria. [**Espundia, a Dermal Leishmaniasis.**]—*Crónica Méd.* Lima. 1928. July. Vol. 45. No. 781. pp. 200–210.

A German version of this paper was reviewed in this *Bulletin,* Vol. 25, p. 72.

C. M. W.

Leger (Marcel). Leishmanioses visceraes e tegumentares. Identidade ou parentesco estreito das differentes leishmania. [**Visceral and Dermal Leishmaniasis. Their Relations.**]—*Rev. Med.-Cirurg. do Brasil.* 1928. May. Vol. 36. No. 5. pp. 195–204. [22 refs.]

A review of literature dealing with the relationship of the various leishmania to one another.

C. M. W.

Graham (J. D.). Résumé des travaux de la Commission du Kala-Azar dans l'Inde Britannique pendant l'exercice 1927–1928. [**Summary of the Work of the Indian Kala Azar Commission in 1927-1928.**]—*Bull. Office Internat. d'Hyg. Publique.* 1928. Oct. Vol. 20. No. 10. pp. 1618–1623. [1 ref.]

This article is a summary of the results obtained by the Indian Kala Azar Commission.

C. M. W.

Cortes (Narciso Alonso F.). Notas preliminares sobre la leishmaniosis visceral en la provincia de Cadiz. [**Kala Azar in the Province of Cadiz.**]—*Medicina Países Cálidos.* Madrid. 1928. July. Vol. 1. No. 4. p. 382.

The institution of an anti-malaria campaign in the province of Cadiz in 1927 enabled observations to be made with reference to the presence of kala azar. The survey has brought to light nine cases of the disease diagnosed by spleen puncture and by clinical examination. Four of the cases came from Arcos, two from Xeres, and one each from Bosque, Ubrique and Espera.

C. M. W.

De la Vega (Jimena F.). Un nuevo caso de leishmaniosis visceral en adulto. [**Case of Kala Azar in an Adult in Spain.**]—*Medicina Países Cálidos.* Madrid. 1928. Sept. Vol. 1. No. 5. pp. 452–455. [Faculty of Med., Madrid.]

Kala azar in Spain is usually of the infantile type. The paper describes a case in a man 29 years of age who had spent his life in various places in the Province of Madrid. Treatment with stibenyl produced a marked improvement in the clinical condition.

C. M. W.

Angolotti (E.). Un caso de leishmaniosis visceral diagnosticado "post mortem." [**Case of Kala Azar in Spain, diagnosed after Death.**]—*Medicina Países Cálidos.* Madrid. 1928. Nov. Vol. 1. No. 6. p. 550.

A note of a case in Spain which was diagnosed as kala azar by discovery of the organism after death.

C. M. W.

Meslay-Coirre & Cochez. Kala-azar méditerranéen chez un adulte. [**Mediterranean Kala Azar in an Adult.**]—*Rev. Méd. et Hyg. Trop.* 1928. July–Aug. Vol. 20. No. 4. pp. 109–113. With 1 chart in text.

A case of kala azar in a soldier 22 years of age who died in Paris after his return from Algeria, the diagnosis being made only after death following splenectomy performed for supposed Banti's disease.

C. M. W.

Boyd (T. C.) & Roy (A. C.). **A Preliminary Note on the Decolourisation of a Solution of Methylene Blue when left in Contact with Kala-Azar Serum.**—*Indian Med. Gaz.* 1928. Oct. Vol. 63. No. 10. p. 568.

Kala azar serum in which a certain gram negative bacillus was growing had the property of decolourizing solutions of methylene blue. Apparently normal serum did not do this.

C. M. W.

Bérézнyack (M. E.). [Catalase sanguine dans la leishmaniose viscérale.] [**Blood Catalase in Kala Azar.**]—*Pensée Méd. d' Usbékistane.* Tashkent. 1928. June–July. No. 9/10. pp. 31–36. [In Russian. French summary p. 97.]

In 17 cases of kala azar it was noted that there was a marked diminution in catalase as estimated by the method of Bach and Zoubkowa. Even long after treatment and convalescence the figure of 3·24 rarely rose to 8 or 10.

C. M. W.

Artamonoff (A. S.). [Guérison de quatre cas de leishmaniose en présence d'une médication insuffisante.]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 7. pp. 414–418. [4 refs.] [In Russian.]

Minina (R. P.) [Le néosalvarsan dans le bouton d'Orient.]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 6. pp. 349–351. [3 refs.] [In Rusisan.]

Proutowych (V. O.). [Traitement de la leischmaniose cutanée par l'ionthophorèse.]—*Pensée Méd. d' Usbékistane.* Tashkent. 1928. Aug. No. 11. pp. 35–39. [In Russian. French summary p. 103.]

LEPROSY.

VEDDER (Edward B.). **A Discussion of the Etiology of Leprosy, with Especial Reference to the Possibility of the Transference of Leprosy by Insects, and the Experimental Inoculation of Three Men.**—*Philippine Jl. Sci.* 1928. Nov. Vol. 37. No. 3. pp. 215–245. With 6 text figs. [26 refs.]

From an interesting discussion of well-known data Vedder concludes that the small percentage of persons living in close contact with lepers who become infected may be explained equally well by insect transmission as by direct contagion. Charts showing the relation between the incidence of leprosy in different provinces of the Philippine Islands and other data given show a general, but irregular, relation of leprosy incidence to density of population, the proportion of cultivated land, and to the poverty of the people, but none of these factors is considered to be of major importance. Nearly 100 *Aëdes aegypti* mosquitoes were fed on nodular or macular leprous lesions rich in acid-fast bacilli, and in 41 per cent. acid-fast bacilli were found on immediate microscopical examination, so that they might easily infect anyone bitten soon after such a feed. With the sanction of Governor-General Wood, three long-time volunteer prisoners out of a number available with clean family histories and previous isolation in jail for two years, were submitted to experiment, one by the intradermal injection of fresh leprosy nodule material, and the other two by repeated bites of from 42 to 82 *Aëdes aegypti* just previously fed on the skin over positive nodular and macular leprous lesions. Up to the time the author left the Philippines, about two years later, the results in all were negative, but the prisoners will be kept under observation; as the author points out, a negative result may be due to insusceptibility of the subjects.

L. Rogers.

LEPROSY NOTES. 1928. Oct. No. 3. 32 pp. and 1929. Jan. No. 4. 32 pp. Issued quarterly by the British Empire Leprosy Relief Association, 24, Cavendish Square, London, W.1.

This is a new quarterly publication of The British Empire Leprosy Relief Association containing short articles on leprosy work in the British possessions and elsewhere for distribution to workers on leprosy. Some of the papers deal with work already recorded in this *Bulletin*, so only brief notes of anti-leprous activity from little known centres can be mentioned here. The successful cultivation of *Hydnocarpus wightiana* and *anthelmintica* trees from seed distributed by the Association is reported from five of our colonies in tropical Africa, as well as British Guiana, the West Indies and Fiji, and fruit has already been obtained in the last, so good supplies of these oils will soon be widely available. It is reported that lepers are flocking for treatment to colonies founded for them in several of our African possessions in such numbers that all cannot at present be accommodated, and wholly on a voluntary basis. Land for cultivation is provided wherever possible so that the colonies soon become self-supporting, as regards food, and hutting accommodation and dispensaries and drugs for treatment are being provided by the Association in many areas, especially of

Africa. An article on leprosy in the Baltic countries shows 702 known cases. In Brazil Dr. de Souza ARAUJO estimates the lepers at 24,000, or 0·67 per mille and ten leper colonies are needed.

An interesting account of the foundation of a leper colony at Itu in South Nigeria, with the help of the Nigerian Government and the Association, by Dr. A. B. MACDONALD records that over 1,000 new voluntary patients have been treated there in a little over a year. In Tanganyika Territory Dr. J. O. SHIRCORE records 3,299 lepers in 42 voluntary leper segregation camps, but since the visit of Mr. Frank OLDRIEVE, the Secretary to the Association, to this colony several treatment and investigation centres have been established under missionary doctors, with the help of the Government and the Association, and they are already attracting a number of lepers. In Southern Nyasaland such a treatment centre under Dr. C. F. BIRKENSTOCK, has 90 cases under treatment, and with sufficient facilities 500 could be obtained within a few months. The results are said to be very gratifying under hydnocreol, alepol and potassium iodide treatment, and eight recovered patients have been discharged without any relapses.

In India the model leper hospital at Dichpali, under the Rev. G. M. KERR, Dr. ISABEL KERR and Dr. LOWE, has been developed into a regular teaching centre for the South of India on the lines of Dr. MUIR's clinic in Calcutta. No " burnt-out " cases are now admitted, so all are benefiting by the treatment, including private patients, the accommodation for whom is always full. In Bengal Dr. MUIR's leprosy surveys are being continued, and are resulting in the steady increase in the number of leper dispensaires supported by the local authorities. Altogether a very healthy increased interest in the leprosy problem throughout our Empire is revealed by this little publication, especially if compared with the apparently hopeless outlook for the leper only about a single decade ago.

L. R.

MAXWELL (James L.). **Leprosy. The Problem of its Eradication from China.**—*China Med. Jl.* 1928. Dec. Vol. 42. No. 12. pp. 869–879. [1 ref.]

Leprosy may go back as far as 1100 B.C. in China, and it would appear probable that the disease reached south-east China from India by sea. It is now very wide-spread, and the total number of lepers must run into hundreds of thousands, mostly in the South, and in Shantung, Manchuria and Korea in the north. The writer agrees with the common view that segregation started the decrease of leprosy in Western Europe in the Middle Ages, and improved economic conditions completed the process of its disappearance, so these factors have to be considered in China, where improved economic conditions as well as isolation are essential to complete success. He is, however, convinced that under present conditions strict compulsory segregation would be " more likely to assist in spreading leprosy than in eradicating it." In early European days of small villages, lepers could be effectively expelled to leper houses, but with present day large towns and easy communications, it is impracticable anywhere on account of the facilities for hiding cases with consequent spread of the disease. Any attempt to isolate such a chronic disease is illogical and impracticable, especially in a densely populated, badly infected country such as China. It has failed even in the case of the far more dangerous and few typhoid

carriers. " The truth is that in relation to lepers and leprosy, there is a condition of nearly world-wide and acute hysteria which will stop to consider neither reason nor logic."

A third and very important factor is that " the cure of leprosy is a definite and increasingly important fact." He uses the word " cure " in the clinical sense, as in tuberculosis, and not in the pathological one of the elimination of the last bacillus from the body, but that the patient is free from active infection and able to resume normal life without being a menace to others. Such clinical cures should be effected in practically every early case and in 15 to 20 per cent. of long standing cases of 8 years' duration. The latter should receive treatment, but the essential thing is to find and treat the early cases, and compulsory segregation will defeat this object by causing such to be hidden; so drastic measures do more harm than good in the present day. He therefore advocates voluntary isolation and care of advanced infective and ulcerated cases, and hospitals for the treatment of earlier more amenable ones, and where possible ROGERS' plan of six-monthly examinations of all house contacts, to detect and treat the earliest infections from them, and lastly, education to bring home to the people the value of treatment, especially in the early stages. In some of the cities notification of early cases could be enforced with good results. [These views of such an authority on China are most timely, and are in accordance with the policy of the British Empire Leprosy Relief Association regarding all tropical British possessions, and especially those in Central Africa.]

L. R.

GREEN (Richard). **Annual Report of the Medical Officer in Charge, Leper Asylum, Kuala Lumpur.**—*Federated Malay States Ann. Rep. Med. Dept. Year 1927.* Appendix N. pp. 144–149.

The number of lepers treated in 1927 was 818, against 704 in the previous year. The admissions numbered 226, of which no less than 104 were self-diagnosed voluntary admissions, a good testimony to the care and efficient treatment they receive. The rest were diagonsed at hospitals and sent to the institution. Moreover, a large proportion of the voluntary cases are early ones, in place of the advanced cases formerly coming as a last resort. Thirty-one cases have lost all clinical signs, but 9 are still positive bacteriologically, and none will be discharged until longer negative. TRAVERS' oral use of *H. anthelmintica* nuts with *Cannabis indica* after the old Chinese plan is still considered to be the most convenient form of treatment. and E.C.C.O. injections are also given with promising results if long continued. Injections of colloidal antimony and local applications of mercurochrome 220 or 1 per cent. methyl violet are of use for ulcers. The leprous reaction is discussed and some interesting observations are recorded to show that the intra-dermal injection of lepra bacilli from a freshly excised nodule produces soft reddish patches containing few bacilli only if injected during a reactive or sensitized phase; indicating that these fresh reaction lesions are produced by reactions where a few bacilli are present,and are not due to further dissemination of bacilli; this, the most commonly accepted view, indicates that such reactions are a favourable phenomenon. Segregation of all lepers, including old

anaesthetic cases, is still considered essential in Malaya, although only bacteriologically positive cases appear to be admitted, so that early negative, and most easily cured cases, are apparently not provided for.

L. R.

Tisseuil (G.). Prophylaxie de la lèpre en 1927 à l'Institut " Gaston Bourret " (Nouvelle-Caledonie). [**Prophylaxis of Leprosy in New Caledonia in 1927.**]—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. pp. 288–293.

The campaign against leprosy includes annual inspections of schools, of all immigrants and emigrants, and of the tribes for cases of the disease. The inspections showed a clear increase of the disease among the Oubatche tribe, but stationary or decreasing numbers among the others. The chaulmoogra ethyl esters are used in treatment with advantage. The " leproseries partielles " allow the cases to be isolated not far from their own people, and they now contain 607 lepers and 896 suspects, including 23 Europeans. The definite cases have decreased somewhat in the last decade, but the suspects have increased considerably. Where missionaries are available the treatment is more regular and effective.

L. R.

Ramsay (G. W. St. C.). **A Study of Leprosy in Southern Nigeria.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Nov. 25. Vol. 22. No. 3. pp. 249–262. [7 refs.]

This article deals with observations made during a brief visit to the United Free Church Mission Leper Colony at Itu in South Nigeria with 616 inmates, founded by Dr. Macdonald. The disease is considered to be a serious menace to the country and compulsory segregation is impracticable. Many lepers are driven out of their villages or even murdered, and the Government leased 30 acres of good ground for this colony for cultivation by the lepers, and drugs have been supplied by the British Empire Leprosy Relief Association. The average duration of the disease on admission was six years, 76 per cent. of the cases began between the ages of 16 to 35 years, over two-thirds were males, 80 per cent. were of the maculo-anaesthetic type, 23·5 per cent. showed deformities, scabies was present in 32 per cent. and many showed helminthic or filarial infection. Bacteriological examinations showed positive results in only 21·6 per cent., owing to the rate being only 9·7 per cent. in the common maculo-anaesthetic type, but 85·2 per cent. of the nodular cases and 66·7 per cent. of the mixed cases were positive. The Sachs-Georgi test was done in all the cases, as the full Wassermann test was not practicable, and positive reactions due to the presence of syphilis and yaws were obtained in 42·7 per cent., indicating anti-spirochaetal treatment.

L. R.

Cooke (F. H.). **Leprosy in the British Mandated Territory of Togoland.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Jan. 31. Vol. 21. No. 4. pp. 301–304. With 2 figs. on 1 plate.

Before the advent of the whites lepers were expelled from their villages into special leper ones, forbidden to marry and fed by their

relatives. The Germans attempted compulsory segregation, but the cases were hidden and infected the healthy, while the more effective old native isolation has been abandoned. The author found the disease very common so he erected a temporary camp for voluntary inmates and in about a year it was filled with 82 lepers and many had to be turned away, but some attend as out-patients for treatment. The Chiefs are helping to build more accommodation, and the great advantages of the voluntary over the compulsory plan is already evident, while the 26 acres of land allow of cultivation. Injections of ethyl esters, in the form of 5 cc. doses of moogrol, are given, and potassium iodide and sodium salicylate orally afford great relief of pains, and in some slow absorption of nodules occurs. Reactions were followed by more rapid improvement.

L. R.

Remlinger (P.). L'état de la lèpre au Maroc. [**Leprosy in Morocco.**] —*Bull. Soc. Path. Exot.* 1928. Oct. 10. Vol. 21. No. 8. pp. 611–616. With 1 text fig. [19 refs.]

This account gives little new information. In 1927 Robineau reported not less than 197 cases in Fez in four years and the official estimate was 302 in 1925. Hospitals for the more active contagious cases and agricultural colonies for more benign forms are advocated.

L. R.

Balina (Pedro L.). Estado actual del problema de la lepra en nuestro país. [**Leprosy in Argentina at the Present Day.**]—*Semana Méd.* 1928. Nov. 22. Vol. 35. No. 47 (1819). pp. 1381–1405. With 3 text figs. [13 refs.]

This article consists of four parts and an appendix. In the first is given an account of the distribution of leprosy in the Argentine, and particularly of the inferences which may be drawn from the author's own experiences. He states that between 1910 and 1921 he himself attended 142 cases, whereas during the last 7 years he has had 229 fresh cases, which he regards as an increase of 166 per cent. of lepers in Buenos Aires. From figures obtained from the Department of Hygiene the total is over 1,500. Maps are given showing the distribution in the various provinces, from which it is evident that leprosy is present in all. It is noted that many are living in Buenos Aires, and that " prophylaxis is impracticable where there are 200 lepers within the city itself." The second part is a brief consideration of the legal enactments and their development to the present time. In part III the question of the possibility of overcoming leprosy in the Argentine is dealt with and the author believes that if preventive measures were properly and scientifically carried out there is no reason why the province should not be made perfectly healthy in this respect, but isolation is the first basis of any measure. Part IV goes in more detail into the author's suggestions. He recommends the establishment of six fresh leprosaria. Next are mentioned the different modes of dealing with the cases according to the stages of their disease, on the usual lines.

H. Harold Scott.

Peralta Ramos (Alberto). Lepra y embarazo. Puede estar justificada la interrupción artificial de la gestatión y la esterilización definitiva ? [**Leprosy and Pregnancy. Are Interference with the Course of Gestation and Performance of Sterilization Justifiable?**]—*Semana Méd.* 1928. Oct. 18. Vol. 35. No. 42. pp. 1013–1017.

This is an interesting article, but those who look for any definite pronouncement will suffer disappointment. The reasons for terminating pregnancy prematurely are naturally all for the benefit of the mother ; in the case of leprosy the question is largely one of eugenics and social hygiene. The case is described of a woman of 30 years with five healthy children, now again seven months pregnant and showing signs of leprosy, which had been diagnosed two months previously. Labour was induced and sterilization carried out.

H. Harold Scott.

Rodriguez (Jose). **Diagnostic Problems of Leprosy.**—*Jl. Philippine Islands Med. Assoc.* 1928. Sept. Vol. 8. No. 9. pp. 385–390.

This is a lecture dealing with the clinical diagnosis of early leprosy in bacteriologically negative cases to allow of early treatment. Stress is laid on loss of sensation to temperature, followed by that to pain, both occurring before that to touch. Paresthesia in the absence of loss of the knee jerks is also a valuable early sign. Leucoderma, tinea flava, seborrhoea, scleroderma, psoriasis and lupus erythematosus and vulgaris are the skin affections most likely to be confused with leprosy.

L. R.

Leger (Marcel). La lèpre et son diagnostic bactérioscopique. [**Bacteriological Diagnosis of Leprosy.**]—*Presse Méd.* 1928. Dec. 19. Vol. 36. No. 101. pp. 1615–1616.

This paper deals with the ordinary methods of bacteriological diagnosis and records that in Senegal in the skin form 86 per cent. showed acid-fast bacilli in the nose, and 46 per cent. of nerve cases were positive. The value of gland puncture in revealing the lepra bacillus after the skin and nose have become negative is confirmed.

L. R.

Monacelli (M.). Sulla reazione di Rubino nella lepra. [**Rubino's Reaction in Leprosy.**]—*Giorn. Ital. di Dermat. e Sifil.* 1928. Oct. Vol. 69. Year 63. No. 5. pp. 1472–1476. [8 refs.] [Dermo-Syph. Clinic, Univ., Rome.]

This reaction, first announced in June, 1926, consists in mixing the serum with an equal volume of a suspension of sheep's corpuscles to which has been added a definite amount of formalin [see this *Bulletin*, Vol. 24, p. 557]. A uniformly opaque mixture results which slowly clears by sedimentation of red cells after several hours in the case of normal serum, rapidly with leprotic. Rubino reported 25 positive out of 32 lepers and, later, 88 out of 121, while only 7 of 300 controls reacted positively. Others, notably Paullier & Errecart, and Marchoux & Caro [*l.c.* Vol. 25, p. 978], have repeated his tests with

varying results. The former found 6 out of 17 lepra sera negative and 5 of 60 controls positive. RUBINO insists that his test is quite distinct from the corpuscle-sedimentation test.

The author has used MARCHOUX's modified technique, the details being given as follows:—

A certain volume of defibrinated blood of a sheep is repeatedly washed and then made up to the original volume with normal saline. Formalin to 10 per cent. is then added, and the whole left at room temperature for 24 hours, again washed three or four times and brought to the original volume with saline as before. A thick, turbid brown fluid results. 0·2 cc. of this is added to 1 cc. of serum in a test-tube, well shaken to obtain a uniform suspension and then placed at 37° C. In a few minutes, 30 at most, the corpuscles collect in a mass at the bottom, leaving the clear fluid above, in the case of leprosy. A normal serum sediments but very slowly, taking several hours. Of 13 leper patients 12 gave a positive; these were all either the nodular or mixed forms; the only negative was a patient with anaesthetic leprosy. 45 controls were all negative. The test should prove useful, therefore, where leprosy is diffuse and it is desired to test a large number of individuals.

H. Harold Scott.

STANZIALE (R.). **The Value of examining the Cerebro-Spinal Fluid in Leprosy.**—*Jl. Trop. Med. & Hyg.* 1928. Dec. 1. Vol. 31. No. 23. pp. 305–306. [5 refs.]

Ten cases of the nodular anaesthetic type were examined with the following results. Positive Wassermann reactions were found in six, excess of globulin in five and hyperalbuminosis in four, but in only one were all three reactions obtained. Lymphocytosis of from 1·4 to 56 elements per cmm. was found in five cases. No lepra bacilli could be detected even with the centrifuge. The inconstant nature of the changes found indicates that they are of no practical importance.

L. R.

WAYSON (N. E.) & BADGER (L. F.). **The Oral Administration of Derivatives of Chaulmoogra Oil in Leprosy.**—*Public Health Rep.* 1928. Nov. 2. Vol. 43. No. 44. pp. 2883–2884. [1 ref.]

This brief note records the efforts of DENNY and others to reduce the irritant effects of oral and intramuscular administration of chaulmoogra oil and its derivatives. A preparation of ethyl esters made as follows has been used orally for six months without noticeable gastrointestinal symptoms:—

"The preparation is an emulsion in acacia and simple syrup of equal parts of the mixed esters of chaulmoogra oil, and of cod-liver oil to which iodine is added to make six one-hundredths per cent. The detail of manufacture is as follows: No. 1.—Dissolve 0·625 gram iodine in 250 cubic centimeters esters and heat at 100° C. for one-half hour. Cool and add 250 cubic centimeters cod-liver oil. Add 60 grams of powdered gum acacia and mix thoroughly. No. 2.—Dissolve 65 grams gum acacia in 250 cubic centimeters cold water and when dissolved add 100 cubic centimeters of cane syrup (made by making a saturated solution of sugar in water at 100° C. and then cooling). Add enough water to make a volume of 430 cubic centimeters. Pour No. 1 into No. 2 and beat with egg beater

until emulsified, then add slowly 70 cubic centimeters 95 per cent. alcohol while continuing to beat. The mixture is of about the same consistency as that of the U.S.P. emulsion of cod-liver oil, remains emulsified, and apparently does not deteriorate during periods of six weeks at room temperature.

"The dosage has been given daily. The amount of the dose has been started at 1 or 2 cubic centimeters of the mixture (one-quarter to one-half cubic centimetre of the esters) and gradually increased. Tentatively the maximum dosage to be used has been set at 10 cubic centimeters of esters per week per hundred pounds weight of patient."

L. R.

WELCH (T. B.). **Oil of Hydnocarpus and Alepol. An Appreciation.**—*Jl. Port-of-Spain Med. Soc.* 1927. pp. 5–11.

This paper deals with a careful trial of oil of hydnocarpus and of alepol (sodium hydnocarpate). The author divides his cases clinically into suspects, primary anaesthetic, early cutaneous, late cutaneous and secondary anaesthetic, the last meaning uninfective mutilated or the "burnt-out" class of MUIR, who do not require either segregation or treatment as lepers. The dosage is carefully regulated to produce repeated very slight reactions with breaking up of some lepra bacilli and gradual production of immunity. He agrees with MUIR in pushing the doses in the early and in the late stage, but using much care in the active nodular cases to avoid severe debilitating reactions. The injections are given twice weekly and the doses gradually increased from 1 to 10 cc. of either the oil or of a 3, or even a 4 per cent. solution of alepol with ½ per cent carbolic. Later alepol in 1 or 2 per cent solution may be given intravenously in cases not reacting otherwise. Children do especially well, and good general condition of the patients and exercise are advisable. He finds alepol to be less painful, better absorbed and more active than the whole oil, and he considers alepol "a very important contribution to modern methods of treating leprosy." Patience and care are required and much remains to be done, but the outlook is good.

L. R.

PIERINI (Luis E.). Tratamiento de la lepra. [**The Treatment of Leprosy.**]—*Semana Méd.* 1928. Nov. 1. Vol. 35. No. 44 (1816). pp. 1183–1201. [40 refs.]

This article consists of three parts. The first is a general description and consideration of preparations of chaulmoogra; the other two contain records of the author's personal observations on patients at the Muñiz hospital. In the second part brief notes are given of 63 cases, though it is stated that 32 were treated with ethyl esters and the same number with the oil (mainly Heiser's or Defillo's formula).

Each received in all about 300 cc. and a comparison of the results shows: Definite cures, 1 by each method; apparent cures (but bacilli still found) 2 by the former, 4 by the latter; much improved 9 and 11 respectively; improved 11 and 7; no improvement 5 and 8; dead 4 and 1. In other words, the results were closely similar, the advantage, if any, being with the oil. In the third part, other drugs employed are spoken of in turn; antimony, Oscol Stibium (6 cases), sanocrysin (five cases), nastin (3 cases), cryotherapy (5 cases).

Amongst the final conclusions it is stated that chaulmoogra remains the best remedy and the oil (Heiser's formula) has proved in his patients better than the ethyl esters, the response is quick in early cases and the improvement is earlier and more certain in macular or maculo-anaesthetic forms than in the nodular or mixed ; finally, treatment must be persevered with, the length of the course depending on the time the disease has persisted, the clinical form, the extent of the lesions, and the toleration of the drug by the patient.

H. Harold Scott.

MAXWELL (James L.). **Brief Instructions for the Treatment of Lepers.**—*China Med. Jl.* 1928. Sept. Vol. 42. No. 9. pp. 694–697.

This paper gives the usual dosage of alepol, which is held to be the simplest and probably the most effective preparation at present available, and also those of ethyl esters and potassium iodide by MUIR'S plan, together with the usual local applications. Reprints can be obtained free from The Mission to Lepers, 23 Yuen Ming Yuen Road, Shanghai.

L. R.

HENDERSON (John M.) & CHATTERJI (S. P.). **Notes on the Use of Certain Preparations in Leprosy.**—*Indian Med. Gaz.* 1928. Nov. Vol. 63. No. 11. pp. 620–624. [7 refs.]

Copper chloride-p-diazoiminobenzene hydrochloride, supplied by Dr. T. A. HENRY, of the Wellcome Chemical Research Laboratories, and containing 14·3 per cent. of metallic copper, is unstable, but can be used in freshly made solution and is said to be sterile ; it cannot be heated. It has been given intravenously twice or thrice weekly in doses of from 1 to 10 cc. of a solution of 0·02 gm. in 10 cc. sterile water. No toxic effects were produced and in small doses it lessened nerve pain, and in large doses it produced some leprous reaction, but apparently with little beneficial action on the disease.

Another preparation of unrevealed composition called " succinol " has also been tried in leprosy without benefit.

Fibrolysin of Merck & Co. has also been tested, but it produced unpleasant nervous sequelae and no beneficial action on leprous tissues.

L. R.

BOURGEOIS & TSATSARONIS. Sur un cas de lèpre traité par la bactériothérapie. [**Case of Leprosy treated by Bacteriotherapy.**]—*Progrès Méd.* 1928. July 7. No. 27. pp. 1115–1116.

This is an interesting case of nodular leprosy successfully treated by protein shock by means of a modified bacterial injection on the lines of HASSON'S method, including some acid-fast bacilli from lepromata. A few injections of creosoted chaulmoogra oil were also given and the patient became bacteriologically negative and the lepromes healed after twenty doses of the vaccine in three months, and he has remained well for a year.

L. R.

Lavall & Pomaret. Un cas de lèpre traité par le B.C.G. [**Case of Leprosy treated with B.C.G.**]—*Jl. des Praticiens.* 1928. June 23. Vol. 42. No. 25. pp. 406–408. [1 ref.]

This was a case of mixed leprosy in which abscesses were formed by the injection of B.C.G. vaccine with cachexia and a loss of 18 kilos in weight, but with no improvement in the leprous condition.

L. R.

Stanziale (Rodolfo) Tentativi di terapia della lebbra col tellurio. —*Riforma Med.* 1928. Dec. 17. Vol. 44. No. 51. pp. 1652; 1655–1656. With 2 text figs. [Dermo-Syph. Clinic, Univ., Naples.]

——. **Tellurium Therapy in Leprosy.**—*Jl. Trop. Med. & Hyg.* 1929. Feb. 1. Vol. 32. No. 3. pp. 33–36. With 2 text figs.

The author used the tellurium in three forms: 1. A 10 per cent. suspension of the metal in 5 per cent. glucose; 2. The biniodide, 10 per cent. in oil; 3. Iodo-tellurate of quinine, 5 per cent. in oil. Several patients are undergoing treatment, but only five have completed the course—1–2 cc. every 5–8 days according to the local and general reactions for ten injections—of whom four were tuberculo-anaesthetic and one macular. The local reaction was always marked, especially with the metallic tellurium. The results were that ulcerative states appeared to be favourably influenced, showing a tendency to repair and even actually cicatrizing. All the tuberculous cases showed some improvement, but the only macular case none. Bacteriologically, the former showed also lysis and granulation of the bacteria.

H. Harold Scott.

Cochrane (R. G.) & Mittra (P.). **Notes on the Treatment of Nerve and Joint Pains in Leprosy by the Use of Ephedrine Hydrochloride.**—*China Med. Jl.* 1928. Sept. Vol. 42. No. 9. pp. 697–700. [3 refs.]

The authors confirm the report of Muir and Chatterji regarding the value of ½-grain doses of ephedrine hydrochloride in one drachm of water orally in relieving the pains in leprosy, and also the other symptoms in reactions [see this *Bulletin*, Vol. 25, p. 649].

L. R.

Marneffe (H.). Erythème noueux chez une lépreuse en cours de traitement. [**Nodose Erythema in a Leper under Treatment.**]—*Bull. Soc. Path. Exot.* 1928. Nov. 14. Vol. 21. No. 9. pp. 737–741.

The author describes the well-known rosy nodules appearing in the course of reactions to treatment in leprosy and discusses their possible relationship to coincident tuberculosis, helminthiasis, rheumatism and syphilis.

Marcel Leger in discussion refers to the difficulty in the recognition of tubercle and syphilis complicating leprosy, and he states that Trautmann, working in Madagascar, in some unpublished observations has discovered seroflocculation with "perethymol" for the diagnosis of syphilis and a similar reaction with resorcine for active tuberculosis.

L. R.

i. Lai (Daniel G.) & Lai (Suchen Wang). **The Kahn Reaction in Leprosy. A Study of 167 Lepers in Swatow District.**—*China Med. Jl.* 1928. Dec. Vol. 42. No. 12. pp. 880–883. [8 refs.] [Josephine Bixby Memorial Hosp., Kityang, Kwangtung.]

ii. Wise (Fred). **Leprosy. A Review of Recent Advances in Serology and Immunology.**—*Southern Med. Jl.* 1928. Oct. Vol. 21. No. 10. pp. 837–842. [33 refs.]

iii. Labernadie & André. Recherches sur le sang des lépreux. [**Blood Researches in Leprosy.**]—*Ann. de Méd. et de Pharm. Colon.* 1928. July–Aug.–Sept. Vol. 26. No. 3. pp. 323–328. [6 refs.]

iv. Hayashi (Fumio). [**On Sedimentation Speed of Erythrocytes in Leprosy.**]—*Japanese Jl. Dermat. & Urol.* 1928. Sept. Vol. 28. No. 9. pp. 871–892. [14 refs.] [In Japanese. English summary pp. 62–64.] [Zensei Leper Colony, Tokyo.]

v. Ohmichi (Naoichi). [**On Isoagglutination in Leprosy.**]—*Hifuka Hitsunyokika Zasshi* (*Jl. Dermat. & Urol.*). 1928. Mar. Vol. 28. No. 3. [Summarized in *Japan Med. World.* 1928. Aug. 15. Vol. 8. No. 8. pp. 217–218.]

i. The authors obtained a positive reaction with the Kahn test in only 12·5 per cent. of 165 lepers in South China, and their syphilis rate of general patients was 13·5 per cent. One-third of their positive Kahn tests in lepers were also clinically positive for syphilis; so they regard the Kahn test as being generally negative in lepers without co-existing syphilis.

ii. This paper reviews recent literature already dealt with in this *Bulletin*, and concludes that no reliable blood test for separating leprosy from syphilis and tubercle yet exists.

iii. The authors have carried out a number of careful tests in leprosy, and they conclude that the Bordet-Wassermann (Hecht-Bauer-Mutermilch) test is not more frequently positive in leprosy than in general patients in the Pondicherry hospital, and that the reaction of Matefy is also useless in the diagnosis of leprosy. The red corpuscles sedimentation time is, however, clearly accelerated in leprosy, especially in nodular and mixed types, and is of diagnostic value in the absence of fever and tuberculosis.

iv. This author has tested the rate of sedimentation of the red corpuscles in a large number of leprosy patients, and he concludes "The velocity is increasing proportionately to the seriousity and progressivity of patients."

v. This short abstract records the results of isoagglutination in leprosy as: "Among AB group 9 per cent., A group 24 per cent., B group 35 per cent., and O group 32 per cent. of leprosy."

L. R.

Gomes (J. M.) & Junior (J. Duarte do Prado). Desvio do complemento na lepra. [**Complement-Fixation in Leprosy.**]—*Brasil-Medico.* 1928. Aug. 25. Vol. 42. No. 34. pp. 951–956. [Inst. Hyg., São Paulo.]

The authors had previously reported on the value of the complement-fixation test in leprosy. They here bring forward more cases (selected from a larger number) illustrative of its value in their hands. As antigen they use the defatted *Streptothrix leproides* of Deycke. The

cases are divided into four groups: 1. Apparently mild cases giving a strong positive reaction; there are twelve instances of this; 2. Cases (8 in number) clinically positive, but giving a negative reaction; 3. Persons under observation (5 here detailed) presenting no clinical evidence of disease, whose serum, a year previously negative, gives now a definitely positive reaction; 4. The effect on the serological test (10 cases), when patients are under treatment.

The authors place much reliance on the test, both for diagnosis and for prognosis. Though some sera are negative in the early stages, they soon become positive; the negative are often those where skin lesions only are present and the negative result is probably due to the fact that, the lesions remaining local, antibodies have not developed. Generally speaking, the degree of reaction was found to correspond with the severity of the symptoms, and where the symptoms improved but the reaction remained strongly positive, relapse usually occurred and the prognosis was bad.

H. Harold Scott.

Franchini (Giuseppe). Ancora sulla riproduzione sperimentale della lebbra nella scimmia. [**Leprosy produced Experimentally in the Monkey.**]—*Arch. Ital. Sci. Med. Colon.* 1928. Apr. Vol. 9. No. 4. pp. 195–198. With 1 text fig. & 1 coloured plate. [1 ref.] [Inst. of Trop. Path., Univ., Bologna.]

It has been recorded that leproma tissue inoculated into a monkey (*M. sinicus*) leads to the formation of a tumour rich in lepra bacilli, but the lesion undergoes spontaneous cure within a brief period of two months or so. Professor Franchini places on record one such instance in which, after an interval of many months, a swelling recurred at the same site and juice taken from it was rich in lepra bacilli. The lesion again cleared up, apparently completely, in another two months. The interest herein is twofold. First, although the swelling disappears and bacilli are no longer found, the cure is not complete and the bacilli must be latent; secondly, in spite of the apparent cure, immunity is not produced since the second lesion develops in a manner exactly similar to the first and runs a similar course.

H. Harold Scott.

Araujo (H. C. de Souza). Transmissão da lepra humana ao camondongo branco.—*Sciencia Med.* 1928. Aug. Vol. 6. No. 8. pp. 373–377. With 7 figs. on 3 plates. [10 refs.] Also in *Inst. Oswaldo Cruz, Supplemento das Memorias.* 1928. Aug. 31. No. 1. pp. 5–8.

——. Sur la transmission de la lèpre humaine à la souris blanche. [**Transmission of Leprosy to the White Mouse.**]—*C.R. Soc. Biol.* 1928. Nov. 2. Vol. 99. No. 30. pp. 1337–1339. With 1 text fig. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

This interesting note records the development in a white mouse of a fistula discharging acid-fast bacilli 23 days after inoculation with human lepra bacilli; on sacrificing the animal a local intraperitoneal lepra tumour, and very numerous masses of acid-fast bacilli

in the spleen and liver were found, showing a generalized infection. In another white mouse a leprous nodule with loss of hair over it developed after inoculation with human lepra bacilli, indicating the successful transmission of the infection.

L. R.

Greco (Nicolás V.). Ensayos sobre lepra experimental (cultivos e inoculaciones). [**Experimental Leprosy (Culture and Inoculation).**] —*Semana Méd.* 1928. Dec. 13. Vol. 35. No. 50 (1822). pp. 1629–1642. With 2 text figs. [25 refs.]

The author inoculated leproma tissue into 15 different media which he named alphabetically A to P, omitting L. Those designated A and M proved best.

Medium A is prepared by mixing beef broth 1,000, glycerin 40, NaCl 5, filtered water 1,000 gm., adding two large potatoes cut up and sterilized, making the whole feebly acid, filtering, etc. Medium M is a modification of this : veal broth 1,000 cc., skim-milk(?) (aqua de ubre) 1,000 cc., glycerin (5 per cent.) 100 cc.; add two potatoes cut into thick pieces, sterilize for 20 minutes at 115° C., decant, make up to 2 litres, neutralize, sterilize, filter, etc. Medium N, which was also good, was made from M by addition of the yolk of five eggs incorporated in 250 cc. neutral distilled water.

In these the lepra-bacilli increase in numbers ; they are aerobic and retain the acid-fast properties and are found in groups, the bacilli " producing of a surety a substance which tends to unite or agglutinate them." No growth was obtained on solid media. Inoculation experiments of the first culture into rabbits, guineapigs and white rats gave negative results as did also injections of the original leproma tissue.

H. Harold Scott.

Aben-Athar (Jayme). Saprophitismo e cultivabilidade de *Mycobacterium leprae*. (Nota prévia.) [*Mycobacterium leprae* **as a Cultivable Saprophyte.**]—*Sciencia Med.* 1928. Aug. Vol. 6. No. 8. p. 378.

The author finds that the bacilli of leprosy pass in the faeces, disappear temporarily from breaking up into non-acid-fast granules, and then again appear and multiply, in hyaline capsules which coalesce to form a zoogloea containing acid-fast granules becoming bacillary again. He suggests filtered faeces as a means of cultivating the bacillus.

H. Harold Scott.

Pierini (Luis E.). Tratamiento de la lepra. [**The Treatment of Leprosy.**] —*Semana Méd.* 1928. Oct. 25. Vol. 35. No. 43 (1815). pp. 1122–1139. [165 refs.]

This article constitutes a sketch of the history of the treatment of leprosy, and forms an interesting review.

H. Harold Scott.

Reeves (I. S. K.). **Leprosy.**—*U.S. Nav. Med. Bull.* 1928. Oct. Vol. 26. No. 4. pp. 929–932.

This is a brief paper by a naval surgeon advocating greater use being made by his Service of the opportunities of studying leprosy during visits to tropical countries.

L. R.

Aleixo (A.). Signaes iniciaes ou precursores da lepra.—*Brasil-Medico.* 1928. Nov. 10. Vol. 42. No. 45. pp. 1269–1271.

von Bassewitz (Barão Ernesto). Problemas pathogenicos e therapeuticos da lepra.—*Brasil-Medico.* 1928. Dec. 8. Vol. 42. No. 49. pp. 1370–1375.

——. Urethritis leprosa.—*Dermat. Woch.* 1928. Nov. 3. Vol. 87. No. 44. pp. 1709–1713.

Jeanselme & Horowitz. Un cas de lèpre tégumentaire anormale et prurigineuse chez un malade paludéen et porteur de microfilaires.—*Bull. Soc. française Dermat. et Syph.* 1928. July. No. 7. pp. 538–549. With 3 figs. & 1 chart.

Marneffe (H.). Sur deux cas de névrite aiguë du cubital au cours de la lèpre.—*Bull. Soc. Path. Exot.* 1928. Nov. 14. Vol. 21. No. 9. pp. 735–737.

Masataka (Murata) & Teiryo (Tamiya). La Wassermann--Kaj Murata-Sifilisreakcio ĉe Lepruloj.—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1927. Vol. 6. pp. 185–186.

—— & ——. Serodiagnozo de Lepro per fiksado de komplemento kun oleo ginokardia.—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1927. Vol. 6. pp. 187–192.

—— & ——. La Meinickereakcio per malklariĝo (Meinicke-trübungs-reaktion) kaj la Murata-precipitreakcio ĉe lepruloj.—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1927. Vol. 6. pp. 193–195.

—— & ——. Studoj pri la precipitkurboj ĉe sifilis-, lepra- kaj karcinomseroj.—Serodiagnozo de sifiliso, lepro kaj karcinomo per precipitkurbo.—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1927. Vol. 6. pp. 197–204. With 1 fig.

Montgomery (Hamilton). Report of a Case of Leprosy.—*Proc. Staff Meetings of Mayo Clinic.* Rochester. 1927. Aug. 17. Vol. 2. No. 33. pp. 182–183.

Sakurai (Hosaku). [Pri la staturo kaj kresko de lepruloj.]—*Japanese Jl. Dermat. & Urol.* 1928. Apr. Vol. 28. No. 4. pp. 432–451. With 3 text figs. [Esperanto summary pp. 24–25.] [In Japanese.]

Spillmann. A propos d'un cas de lèpre tuberculeuse observé dans le département de Meurthe-et-Moselle.—*Bull. Soc. française Dermat. et Syph.* 1928. July. No. 7. (Réunion dermatologique de Nancy). pp. 515–519. (R.N. 79–83.)

REVIEWS AND NOTICES.

ARAUJO (Oscar da Silva). Subsidios ao estudo da "Framboesia Tropica." (Bouba, Pian, Yaws.) Primeira Serie. [**Contribution to the Study of "Framboesia Tropica."**]—141 pp. Rio de Janeiro: Typ. da "Medicamenta," Frei Caneca, 26.

This work, which forms the first series of the author's contributions to the study of "Framboesia Tropica," consists of five sections. In the first, which is entitled, "Is Framboesia Tropica the disease referred to in the Bible under the name of 'Zaraath'," he discusses the question whether the disease referred to in the Bible (Leviticus, Chap. XIII) and usually regarded as leprosy was really framboesia tropica. The author comes to the conclusion, with which the reviewer is inclined to agree, that a retrospective diagnosis of this disease is impossible, for it has also been interpreted as syphilis, scabies, eczema, psoriasis, or vitiligo, or not an eruptive disease at all but merely a taboo.

The second section is devoted to a discussion whether framboesia tropica is the disease described by Arabian physicians, particularly AVICENNA and HALI ABBAS, under the title of "Sahafati," and contains a Portuguese translation of the poem by Francisco Lopez de Villalobos, considered by Morejon as superior to Fracastor's work on syphilis. The conclusion arrived at, however, is that the term was used to describe various affections of the hairy scalp but not syphilis or framboesia tropica.

The third section contains an account of the views of the founder of the French dermatology, ALIBERT on framboesia tropica, as expounded in his monumental work entitled "La Clinique de l'Hôpital St. Louis." Contrary to what has been stated by some writers, Alibert did not identify framboesia with syphilis, though he placed the two diseases in the same group, but each in a distinct class, the first group consisting merely of syphilis, while the second embraced various diseases including framboesia.

The existence of framboesia in Brazil before its discovery at the end of the fifteenth century forms the subject of the fourth section, but the conclusion is reached that the disease was not endemic but was introduced by African slaves. The last chapter consists in a refutation of the claim made by CASTELLANI and CHALMERS and other well-known writers that OVIEDO Y VALDEZ (1478–1557) gave a description of framboesia, the view held by the author being that OVIEDO's description applied to syphilis and not to framboesia. A bibliography of the author's contributions to literature from 1911 to date is appended.

The work, which is richly documented by numerous quotations, many of which are from not easily accessible sources, will be welcomed alike by the student of tropical medicine and the medical historian.

J. D. Rolleston.

HEAGERTY (John J.) [M.D., D.P.H., Department of Health, Canada.] **Four Centuries of Medical History in Canada and a Sketch of the Medical History of Newfoundland.** With a Preface by A. G. DOUGHTY, C.M.G., F.R.S.C., Dominion Archivist. Vol. 1, pp. xviii+395. With 14 plates. Vol. 2. pp. vii+374. With 24 plates. 1928. Bristol; John Wright & Sons, Ltd. London: Simpkin, Marshall, Hamilton Kent & Co., Ltd. [50s.]

In *Four Centuries of Medical History in Canada and a Sketch of the Medical History of Newfoundland* Dr. John Heagerty, of the Department of Health, Canada, has brought together the result of much research in many different directions. The subject matter of these two volumes, considered in six parts and eighty-four chapters, deals with epidemics of disease,

pioneer medical men, medicine and surgery, public health, medical schools, hospitals, and an appendix contains the sketch of the History of Medicine in Newfoundland mentioned in the title. The first 220 pages in Volume I are devoted to the epidemics of scurvy, small-pox among the Indians and among the early settlers, yellow fever (mal de Siam), plague ship fevers, mal de la baie St. Paul, leprosy, cholera, and influenza. In 1773 attention was first called to the peculiar disease, traditionally ascribed to the arrival of a detachment of Scottish troops, but also called " mal anglois " and " la maladie allemande." Beginning with oral pustules the disease subsequently behaved like syphilis, and could be cut short by mercury, so that it was regarded as syphilis, though children formed a large proportion of the infected, and it was often extragenital in origin. The occasions on which yellow fever has been introduced into Canada, mainly in Quebec, are critically considered, and though outbreaks have been quoted as occurring in Quebec in 1805 and at Halifax in 1861 the author has not found any record of them ; but he admits that, though most of the cases of ship fever were typhus, some of them may have been yellow jack. The first epidemic of typhus in Canada was in 1659 and was introduced by French immigrants. The epidemic in 1847 among Irish and English immigrants at the Quarantine Station in Grosse Isle, was an appalling tragedy. In the seventeenth century small-pox ravaged the Indians who came in contact with the whites, and as a result the Jesuits were suspected of witchcraft by the natives, who naturally tried to get their revenge. Inoculation was introduced about 1768 by an army surgeon called Latham, and vaccination by John Clinch, a friend of Jenner's, as early as 1798, the year of the publication of the " Inquiry into the Cause and Effects of the Variolae Vaccinae." Small-pox still takes its toll of the red men of North America; and as lately as 1885 there were anti-vaccination riots in Montreal. As far as is known leprosy first appeared in 1815 in New Brunswick, and from then until 1924 there have been 319 lepers admitted to the Lazarette, chiefly from districts where it has long been endemic in New Brunswick. In spite of precautions cholera gained entrance into Canada in 1832 and, starting in Quebec, where there were nearly four thousand deaths, passed through the Dominion. The epidemics of influenza since 1700 are retailed, though the constant presence of small-pox and the occasional epidemics of cholera and typhus seem to have deprived it of much attention. It is interesting to note that before the advent of the French the Indians had few diseases, scurvy and eye affections due to the irritation of smoke in their chimney-less houses being the commonest ; whereas the infections, venereal disease, and possibly tuberculosis were importations.

Humphry Rolleston.

CABANÈS. Esculape chez les artistes. [**Aesculapius in Art.**]—401 pp. With 196 figs. & 1 plate. 1928. Paris ; Librairie Le François, Boulevard Saint-Germain 91.

A melancholy interest attaches to this book, the last to be published in his lifetime by Dr. Cabanès who recently died at the relatively early age of 60 after a life devoted to research in the bypaths of medical history and the illustration of the relations of medicine to literature and art.

The object of the present work, as we learn from the preface, is to prove the falsity of the view that an antagonism exists between Science and Art. Many great artists such as Leonardo da Vinci, Michael Angelo, Cellini and Titian, on the one hand were men of science, and eminent men of science, on the other, such as Pasteur and Charcot, were artists of considerable merit.

In the first chapter, which deals with deformities of the face and other anomalies of this region, special attention may be drawn to Peruvian vases

of the period of the Incas in one of which the figure presents the characteristic facial lesions of leishmaniasis, while in another the lesions of blastomycosis are portrayed.

After chapters on deformities of the neck, spine and abdomen and the subjects of goitre, obesity, dwarfism and blindness as represented in art, we come to that which will be of most interest to our readers entitled "Great epidemics in History and Art," wherein the author deals successively with plague, leprosy, syphilis and small-pox, the history of which he illustrates from contemporary panels, engravings and pictures.

Special attention is given to St. Roch, the patron saint of the plague stricken, who was born at Montpellier at the end of the thirteenth century, and spent 20 years of his life nursing the victims of plague.

It is noteworthy that Jacques Daviel, who invented the operation of extraction of the lens for cataract, was one of the medical officers specially appointed to visit plague patients in the middle of the eighteenth century.

The history of leprosy is illustrated by pictures of St. Elizabeth of Hungary, Edward the Confessor and St. Francis of Assisi whose devotion to the lepers was a favourite subject for Allbrecht Durer, Hans Holbein and other early painters.

The next three chapters, which are illustrated by the work of Teniers, Sodoma, Rubens and Goya, will be chiefly of interest to the neurologist and psychiatrist, as they are concerned with the representation in art of demoniacal possession, hysteria, insanity and epilepsy.

The following chapter on surgery in art, in which the author acknowledges his indebtedness to Professor Paul Lecène's work on the evolution of surgery, contains passages illustrating the history of phlebotomy, and other minor, operations including the surgical fiction of extraction of stones from the scalp, which was so favourite a subject with the Dutch painters.

The remaining chapters deal with the portrayal of chiropodists, dentists and uroscopists, and great medical discoveries among which vaccination holds the foremost place.

In an appendix enlargement of the thyroid gland is illustrated by the pictures of Flemish, Dutch and German artists, such as Memling, van Eyck, Rubens, van der Weyden and Holbein, to mention the best known.

This book, like most of the author's other works, will be read with enjoyment by all those interested in the history of medicine and antiquarian research.

J. D. Rolleston.

Cook (Cecil). [M.B., Ch.M. (Syd.) D.T.M.&H., Wandsworth Research Scholar.] **The Epidemiology of Leprosy in Australia. Being the Report of an Investigation in Australia during the Years 1923-1925 under the Terms of the Wandsworth Research Scholarship of the London School of Tropical Medicine.**—*Commonwealth of Australia. Department of Health Service Publication Number 38.* 303 pp. With 16 figs. (5 maps). 1927. Canberra.

This publication forms the Report of an investigation in Australia during the years 1923–1925 under the terms of the Wandsworth Research Scholarship of the London School of Tropical Medicine, and presents for the first time, as we learn from Dr. Cumpston's preface, a complete record of the known facts relating to leprosy in Australia.

After an introduction in which the scope of the enquiry is set forth, the author successively considers the occurrence of leprosy in the various divisions of the Commonwealth, viz., the Northern Territory, Western Australia, Queensland, New South Wales, and Victoria.

It is shown that leprosy was unknown among the aborigines and early European settlers, but was introduced by coloured labourers from China and the Pacific Islands, subsequent to the discovery of gold in the early

fifties of the nineteenth century. The differences in the distribution of the disease in the various states are to be attributed to local variations in racial, social and climatic factors determining endemicity.

Infection in aliens was transmitted to the aborigines, among whom it became endemic, but it was only where Europeans lived in intimate association with the aborigines that infection was spread from natives to white.

The recommendations made by the author for dealing with the situation, particularly in Queensland where leprosy is most prevalent, are as follows:—

(1) Strict isolation of the lepers in a remote district but with attractive surroundings to promote contentment and discourage attempts at escape.

(2) Regular re-examination.

(3) Intensive treatment.

It is particularly important that the leper patient should be kept away from the aborigines, who are extremely susceptible to infection.

An appendix contains the Queensland Leprosy Act of 1892.

The report is illustrated by coloured maps of the various states showing the endemic areas of leprosy at the present day and in past times.

J. D. Rolleston.

WALL (F.). [Colonel, I.M.S., C.M.G., K.H.S., C.M.Z.S.] **The Poisonous Terrestrial Snakes of our British Indian Dominions (including Ceylon) and how to recognize them. With Symptoms of Snake Poisoning and Treatment.**—pp. x+173. With 40 text figs. Fourth Edition. 1928. Bombay: Published by the Bombay Natural History Society. [Rs. 4; 8s.]

In form and style this edition differs little from its predecessor reviewed in this *Bulletin* in 1914 (Vol. 3, p. 62), but a few improved figures have been substituted in Part I, which deals very adequately with the identification of the individual species of Indian Elapine and Viperid snakes; and by some additions and modifications in Parts II and III, which treat respectively of snake-bite and its effects and with methods of treatment, the author naturally has aimed at bringing the book up-to-date. Selected cases of snake-bite illustrating severally the effects, and their symptoms, of the venoms of the common dangerous species remain a vivid and serviceable feature of Part II. In the discussion of treatment (Part III) the use of the ligature (even of a well-applied rubber band) is slighted, the local injection of permanganate undervalued, and of gold chloride decried.

These local measures, of course, are not supposed to have any effect unless they are applied promptly; but when employed without delay they may reasonably be expected at least to check and restrict absorption of venom and so to facilitate the action of antivenoms, or—if these are not at hand—to give time for the employment of useful symptomatic remedies. They may indeed do much more; since ACTON and KNOWLES showed, in 1914, in their carefully controlled experimental *Studies in the Treatment of Snake Bite* (see this *Bulletin*, Vol. 9, pp. 237–241) that ligature alone, if applied at once, could save animals (rabbits) that had received lethal doses of Russell's viper venom; that the immediate local injection of 10 cc. of a 5 per cent. solution of a permanganate (K, Ca, Zn) could save monkeys that had received more than fatal doses of cobra and viper venom; and that a monkey which had received 25 lethal doses of cobra venom recovered from the effects without any further treatment than the application, within 3 minutes, of a ligature (rubber tubing) followed by the injection, within 23 minutes, of 10 cc. of a 5 per cent. solution of gold chloride. Of this fine experimental work, so confirmatory of general experience, no recognition is to be found in the present volume. The author seems also to have overlooked several papers published in recent years that support the original conclusion of CALMETTE, that snake antivenoms are not so rigidly specific in quality and scope as we have since been taught to believe.

A. Alcock.